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REVIEW & TRANSLATION

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Soviet Geography: Review and Translation

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This translation and publication project was undertaken by the American Geographical Society in the conviction that the dissemination of the fruits of Soviet geographic research would be a service to American geographers and would help bring about professional contacts between geographers of the two countries. The National Science Foundation encouraged the project and is supporting it by a grant.

Readers are invited to send in their comments and discussion of articles published in *Soviet Geography*. Readers are also encouraged to submit suggestions as to published Soviet geographic literature worthy of translation. Such suggestions should relate to articles of general substantive or methodological interest rather than materials of narrow, specialized appeal.

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Some of the material in this issue was translated under contract Nonr-2892(00) with the Geography Branch, Office of Naval Research, prior to the granting of financial support by the National Science Foundation.

TRANSLITERATION TABLE

Russian			English	Russian			English
А	а	*а*	a	Р	р	*р*	r
Б	б	*б*	b	С	с	*с*	s
В	в	*в*	v	Т	т	*т*	t
Г	г	*г*	g	У	у	*у*	u
Д	д	*д*	d	Ф	ф	*ф*	f
Е	е	*е*	e*	Х	х	*х*	kh
Ж	ж	*ж*	zh	Ц	ц	*ц*	ts
З	з	*з*	z	Ч	ч	*ч*	ch
И	и	*и*	i	Ш	ш	*ш*	sh
Й	й	*й*	y	Щ	щ	*щ*	shch
К	к	*к*	k	Ъ	ъ	*ъ*	”
Л	л	*л*	l	Ы	ы	*ы*	y
М	м	*м*	m	Ь	ь	*ь*	’
Н	н	*н*	n	Э	э	*э*	e
О	о	*о*	o	Ю	ю	*ю*	yu
П	п	*п*	p	Я	я	*я*	ya

(*) Instead of e, use ye at the beginning of names, after vowels and after the soft sign (').

The transliteration table is supplied for the general information of readers and to enable them to identify the geographic names on maps that will be reproduced from time to time in SOVIET GEOGRAPHY.

The transliteration system is the one proposed by the United States Board on Geographic Names. For more general use in textbooks and other popular needs, the following simplifications are recommended by the editor of SOVIET GEOGRAPHY:

1. Eliminate the use of (') and (").
2. Use i for iy, and y for yy.
3. Convert diphthongs ay, ey, oy, uy to ai, ei, oi, ui.

THE WORK OF THE INSTITUTE OF GEOGRAPHY OF THE ACADEMY OF SCIENCES OF THE USSR IN 1958

By D. V. Kravchenko

(From Izvestiya Akademii Nauk SSSR, Seriya Geograficheskaya, 1959, No. 2, Pages 143-146).

Activities of the Institute of Geography of the Academy of Sciences underwent further expansion in 1958. The Institute increased its staff, established three new sections (hydrology, limnology and geography of the USSR) and expanded the number of research and publishing projects. The connections of the Institute's work and practical needs continued to be strengthened; staff members participated increasingly in the work of commissions and organs of the State Planning Committee of the USSR, a number of urgent government assignments to regionalize the USSR for various purposes were fulfilled, research was done on a broader scale in conjunction with various government departments, and the number of articles in various publications was increased (a large part of the Institute's work was published by the Geographical Publishing House). The Institute's foreign ties were strengthened and broadened.

The Institute's work was in keeping with the resolutions of the 20th Congress of the Communist Party and other party and government decisions that stressed the need for more rapid development of all branches of the economy, the creation of a material base for the building of communism, and a more efficient and accelerated exploitation of natural resources, particularly those of the eastern regions of the Soviet Union. Soviet geographic science, called upon to study the whole complex of natural and economic conditions of a given area, should pay special attention to questions of correct specialization and integration in the development of economic regions and of the more rational use of their natural and labor resources for the purpose of raising labor productivity.

In 1958, as in the preceding year, the Institute's research program was defined by the following tasks:

1. Regional studies based on data accumulated for the USSR and foreign countries.
2. Integrated geographic field work (chiefly in the eastern regions) to study natural resources and develop the productive forces of regions through economic exploitation and new construction.
3. A study of the dynamics of physical geographic phenomena to formulate principles for forecasting natural processes and guiding the transformation of the natural conditions of a given area. Of special importance are research on the heat and water balance of the earth's

surface and its role in the dynamics of the natural processes and the appearance of geographic differences, and the determination of methods for transforming the heat and water balance for practical needs. It was in this direction that the Institute conducted studies in 1958 in accordance with the program of the International Geophysical Year (in the glaciology section and, partly, in the climatology section).

4. Paleogeographic research aimed at ascertaining the historical course of development of the geographic medium and thus obtaining the key to the understanding of present-day geographic principles.
5. Research in the field of history of geographic science.

Conducting its research in these main directions, the Institute of Geography produced a number of significant studies in 1958.

Witn the participation of the academies of sciences of the union republics and some universities, work continued on regional geography monographs on the union republics and the main economic regions of the RSFSR and on the people's democracies and the capitalist countries.

In the previous years the Institute published fourteen economic-geographic monographs on the USSR: the Kirghiz, Turkmen, Kazakh, Georgian, Armenian, Azerbaydzhan, Lithuanian, Estonian and Moldavian SSR's, the Karelian ASSR, the Crimea, Western Siberia, the Volga Region and the Northern Caucasus. In 1958 a major study of the Urals went to press, and work was completed on monographs on Eastern Siberia and the Central oblasts of the European part of the USSR. A large collective study was published on the physical geography of Soviet Central Asia; physical-geographic studies of the Urals and the Far East were prepared for the press, and preparation of books on the physical geography of Western Siberia, Central Siberia, Yakutia and Transbaykalia continued. On assignment from the State Planning Committee, work was done on the economic-geographic regionalization of the USSR and economic-geographic characterizations of the seven major economic regions of the USSR were prepared. A physical-geographic regionalization of the USSR was made for a number of scientific and practical purposes.

In 1958, the printing of a major study of the economic geography of Germany (the German Democratic Republic and the German Federal Republic) was being completed in the publishing house of the Academy of Sciences of the USSR; a book on the economic geography of Poland was prepared for the press; and a collection of studies on the economic geography of the regions of China was completed for the press.

For a number of years the Institute has participated in the work of the Rumanian and Bulgarian academies of sciences, which are preparing detailed geographic monographs in their countries. In 1958 this work was completed in the main and in 1959 the studies will be sent to the press. The Institute continued to participate in the field work of the Chinese Academy of Sciences in Sinkiang.

In previous years the Institute published eight books on the geography of capitalist countries: Ireland, Spain, Britain, Kashmir, Burma, the South of the United States, the industrial geography of Italy, a collection of articles on the industrial geography of the United States. In 1958, four more books of that kind were published: the North of the United States, Northern India, Western India and Algeria. Studies were also prepared on Belgium, Italy, Central India and West Pakistan.

The Institute continued to take part in integrated geographic field work in the regions of recent economic development, chiefly in Siberia and the Far East. With the Institute's participation, field parties of the Council on the Study of Productive Forces of the Academy of Sciences of the USSR conducted physical-geographic and economic-geographic field work in Krasnoyarsk Kray, and made a geographic study of Chita Oblast. As a part of the integrated field work of the Council, the Institute, jointly with Chinese scholars, made a physical-geographic study of the Amur basin. A study of the region of the Karakum Canal for the development of irrigation farming and animal husbandry was completed. The final report (text and maps) was prepared for the press. Geomorphic and paleogeographic field work in the eastern part of the Bol'shezemel'skaya Tundra and the western slopes of the Polar Urals was continued, and the geomorphology and Quaternary deposits of the Lena River valley were studied. Some reports and maps were passed on to interested organizations, presented before various special meetings and published in the form of articles.

The Institute took an active part in the Conference on the Development of the Productive Forces of Eastern Siberia in Irkutsk in August, 1958. Members of the Institute read nine papers on various questions of the physical and economic geography and regionalization of Eastern Siberia.

The Institute in 1958 carried out studies of the heat and water balance of the earth's surface, and of the dynamics of physical-geographic phenomena. Considerable results, both theoretic and practical, were obtained in this line of research.

The Institute is conducting studies in accordance with the program of the International Geophysical Year. The Institute is the headquarters for all glaciologic studies made by the Soviet Union in accordance with the IGY program. In 1958 the Institute carried out studies at three Arctic glaciologic stations: on Franz Josef Land (Hooker Island, Tikhaya Bay), on Novaya Zemlya (North Island, the region of Russkaya Gavan') and in the Polar Urals (region of Lake Khodata); heat-balance observations were made at the Zagorsk station near Moscow. The Institute also conducted glaciologic work in accordance with the IGY program at glaciologic stations and in field work of other scientific institutuions: thermometric work on the glaciers of the Terskey-Alatau Range (with the Academy of Sciences of the Kirghiz SSR), the glaciers of the Trans-Ili Alatau (with the Academy of Sciences of the Kazakh SSR), glacial-geomorphic work in the region of the

Suntar-Khayata station in the Yakut ASSR (with the Permafrost Institute of the Academy of Sciences of the USSR), and participated in the work of the glaciologic team of the Antarctic Expedition.

A catalog of glaciers in Soviet regions of present glaciation was compiled and work was continued on an analysis of the climate-forming processes for the purpose of working out a genetic classification of climates and on climates expressed in weather types for regions of glaciologic field work in accordance with the IGY program on USSR territory. Some materials and articles on both topics were prepared for the press. In 1958 the Institute, in connection with the IGY program, proceeded to study the general circulation of the atmosphere and the fluctuations of the main climatic elements in the non-tropical latitudes of the Northern Hemisphere, and present and past glaciation of the Caucasus.

In addition, the Institute in 1958 took part in glaciologic field work of the Chinese Academy of Sciences in the Nan Shan. Also related to the Institute's glaciologic work are its studies on the subject of the snow cover and its economic role. Field research was conducted in 1958 for the study of the structure of the snow cover and the principles of its distribution in the Tien Shan, in the El'brus region, in the Moscow area and in other regions. A study of the geography of snow cover was sent to the press, and the Third Interdepartmental Meeting for the Study and Use of Snow was organized and held in Novosibirsk jointly with the West Siberian branch of the Siberian division of the Academy of Sciences of the USSR. This meeting took note of the considerable volume of snow-cover studies conducted in the USSR, the development of snow science as an independent branch of knowledge, and of the progress in the economic use of snow. The meeting organized a permanent coordinating committee and adopted recommendations for the further development of field work and the organization of the study of snow and snow cover.

Having studied the regulating influence of agricultural measures on surface run-off in dissected terrain in the forest zone, the Institute prepared and sent to the press a study on fluctuations and changes in river discharge. It continued the study of the heat and water balance of irrigated and unirrigated areas and the zonal characteristics of the balance. Field and laboratory research was conducted, and reports and articles were prepared for the press.

For a number of years the Institute has conducted a study of erosion processes. In 1958 it completed a preliminary regionalization of the USSR on the basis of factors affecting erosion: climate, relief, soil and plant cover, agricultural land use. In conjunction with the Chinese Academy of Sciences, the Institute studied erosion processes in the upper course of the Yellow River and worked out methods for combating erosion. This work was completed in 1958. The study materials were handed over to the Chinese Academy of Sciences and a collective symposium entitled "The Loess Country and the Ordos" is being prepared.

In 1958 the Institute proceeded to investigate freshets in the USSR. A collection of articles on freshet problems was prepared and sent to the press, and technical instructions for the calculation of freshets from snow were compiled and handed to the Interdepartmental Commission.

Beginning also in 1958, the Institute engaged in the integrated study and typing of the lakes of the USSR in terms of water and heat balance. The purpose of this work is to ascertain the characteristics of the water and heat balance of lakes in various natural zones of the USSR and to work out principles of typing lakes on the basis of elements of the water and heat balance . Field work was carried out and reports were prepared.

For a number of years the Institute has been studying the tectonic movements of the earth's crust, using data of repreated high-precision levelings. After the publication of a collective study prepared jointly with the Central Scientific Research Institute of Geodesy, Aerial Survey and Cartography and giving a characterization and evaluation of the rate of vertical movements in the western half of the European part of the USSR, the Institute in 1958 continued to study tectonic movements in Western Siberia, after the example of the Caucasus, and in the Volga Region and the Caucasus Piedmont.

Preparation of a major study of mud flows in the USSR continued. This work summarizes the results of the study of mud flows and analyzes the natural conditions giving rise to this phenomenon in the main regions of the USSR. Members of the Institute and other institutions are participating in the preparation of this monograph.

Carrying on its studies in paleogeography and historical geography, the Institute continued work on the history of river-valley formation in the USSR, and the paleogeography, geomorphology and stratigraphy of ancient glacial formations and post-glacial deposits of the Russian Plain. Intermediate reports and a series of articles on this work have been prepared for the press. A study of changes in the animal life of the forest zone and the forest-tundra of the USSR in the face of man's activity was also prepared for the press.

Studying the history of geography in Russia from ancient times to the present day, the Institute in 1958 prepared for the press a study of the history of physical-geographic research in the USSR in 1917—1927. A study of the history of physical-geographic research by the Academy of Sciences of the USSR during the first five-year plan is also being completed. Articles have been published on the work of the First All-Union Geographic Congress (on the occasion of its 25th anniversary) and the Yakut expedition of the Academy of Sciences of the USSR in 1925-1930 in the field of physical geography.

In addition to the Coordinating Meeting on the Study and Use of Snow, the Institute in 1958 organized and held several large meetings and took part in many conferences and meetings. It organized and conducted a working meeting on the study of present-day tectonic movements in the USSR with the participation of representatives from a number of institutions in Moscow and other cities; a coordinating meeting on the study of mud flows in the USSR; and a meeting of Soviet glaciologists on questions connected with the conduct of glaciologic studies during the International Geophysical Year. Jointly with the geographic faculty of the Moscow State University, the Institute held a meeting on geomorphology, which attracted more than 300 participants representing scientific institutions, colleges and production organizations of twenty-five cities of the Soviet Union.

The Institute took active part in a conference on the study and use of the resources of the Ukraine (in Kiev in January, 1958); in a conference on the development of the productive forces of Eastern Siberia (in Irkutsk in August, 1958); in the All-Union Meeting on Applied Climatology in Leningrad, and in a conference on nature preserves.

The scientific ties of the Institute and its members with foreign scientific institutions and individual scholars continued to develop and strengthen. In order to discuss the results of joint projects, members of the Institute traveled to Bucharest, Peking and Sofia. A number of meetings on these questions were held in Moscow. Members of the Institute participated in meetings and congresses in London, Helsinki and Chamonix (France). The Institute took active part in the work of the Fifth General Assembly of the International Geophysical Year and the Meteorological Symposium, and in the plenum of the Permanent Commission of the International Geographical Union on national atlases, all of which met in Moscow in July and August, 1958. Many articles by Institute staff members are being published in foreign publications. A number of major studies have been translated and published abroad.

The Council of the Institute of Geography at the end of December, 1958, heard the report of the Institute's director, Academician I. P. Gerasimov, and the reports of project supervisors on the research and organizational activity of the Institute during the year. At these sessions, as well as sectional sessions, note was taken of the increase in the volume of the Institute's work, the deepening of its theoretical research, and the strengthening of the Institute's scientific ties both with the academies of sciences of the union republics, the branches and sections of the Academy of Sciences of the USSR and government institutions, and with foreign geographic institutions, particularly with the academies of sciences of the people's democracies. In the discussion of the president's report, note was taken of deficiencies in the Institute's activity: the inadequate development of economic-geographic work of a theoretical character, the failure of the Institute's laboratory and experimental work to meet the problems of modern geographic research and the continuing weakness of such work in spite of efforts to improve it. Speakers called for a further strengthening of the Institute's relations with government organizations, particularly with the scientific and technical conferences of the regional economic councils. Note was taken of the need for deepening the Institute's work in the preparation of regional-geography monographs. Proposals were submitted regarding the organization of work on a systematic inventory and appraisal of the natural resources of the USSR.

ON THE QUESTION OF THE PROSPECTS OF DEVELOPMENT OF THE PECHORA COAL BASIN

By M. S. Buyanovskiy

(From Izvestiya Akademii Nauk SSSR, Seriya geograficheskaya, 1959, No. 1, Pages 64-73).

The Urals are the largest and oldest mining region in the Soviet Union. The Kola mining region is one of the youngest, opened up and only partly explored during the Soviet period. The development of both regions is being retarded and impeded either by a shortage of coal (in the Urals) or by its total absence (on the Kola Peninsula). Between these two regions, at an almost equal distance from their major mineral deposits, is the rich Pechora coal basin.

It is quite understandable, then, that there have long been a Ural-Pechora and a Kola-Pechora problem, at the root of which lies the linking of Pechora coal with the minerals of the Urals and the Kola Peninsula.

Both problems have been correctly posed, and a time will probably come when both of them will be resolved. But the significance of the Pechora coal basin goes beyond these mining regions, and the time is not far distant when the Pechora area will begin to play a prominent role in the steel industry of the Center and, probably, also in Soviet exports.

The Pechora coal basin lies mainly in the Komi Autonomous SSR and partly in the Nenets National Okrug. Its area is about 100,000 sq. km.; a large part lies within the Arctic Circle in the Bol'shezemel'skaya Tundra.

The coal basin extends far to the north, almost to the Barents and Kara Seas. The steam coals of the basin lie in its southwestern part and the coking coal in the northeastern part, in a narrow strip extending along the Urals and Paykhoy. In the northeastern part of the basin, the largest deposits are the Vorkuta, Vargashor, Khal'mer-Yu, Upper-Syr-Yaga, Lower-Syr-Yaga, Yun'-Yaga and Usa deposits.

The total coal reserves in the Pechora basin are 344.5 billion metric tons. Seams of workable thickness and market-grade ash contain 110.5 billion tons to a depth of 600 m. and 151.6 billion tons from 600 to 1,800 m., or a total of 262.1 billion tons to a depth of 1,800 m. (Golubev and Makedonov, 1958). The basin has been only slightly explored.

According to preliminary data, the long-flame coal amounts to about 27.1 per cent; (designated by D), gas coal (G) to 30.2 per cent; fat steam coal (PZh) to 27.2 per cent; coking coal (K) to 2.9 per cent; steam coking coal (PS) 3.5 per cent; lean coal (T) 4.2 per cent; and semi-anthracite 4.9 per cent (Golubev and Makedonov, 1958).

In reserves, the basin occupies first place in the European part of the USSR and the second (after the Kuzbas) among the basins being worked in the USSR. The range of coals is very broad, about one third of the reserves being of coking rank. High-quality blast-furnace coke is obtained from a mixture of Pechora PZh, K and PS coals.

But the coal of the Vorkuta, Khal'mer-Yu and Upper-Syr-Yaga deposits, which includes all these ranks, contains a great deal of ash (15 to 28 per cent), and to obtain coke of the required quality from this coal requires prior concentration.

In the Pechora coal basin there are 34 operating mines, in which 15.4 million tons of coal were mined in 1956 and 16 million tons in 1957.

The Pechora coal fields explored thus far permit the construction of several mines with a total yearly productivity of 20 million tons (Sherstnev, 1957). The resources of the Pechora coal basin are enormous and offer the possibility of large-scale mining if materially and technically equipped in the proper manner. The growth of the Pechora basin is complicated by the difficult natural conditions. Mine construction in the Pechora basin costs more than in other basins, "but the favorable geologic conditions and the wide mechanization of coal mining have contributed to the fact that, in spite of the severe climatic conditions, labor productivity at the Vorkuta-ugol' Kombinat has steadily increased and in 1955 exceeded the average productivity of the Ministry of the Coal Industry and of several southern and eastern basins" (Sherstnev, 1957 , p. 20).

Accordingly, Vorkuta mining costs have been declining and in 1956 equaled the mining costs in the Donbas; however, Vorkuta costs remain higher than the costs in the eastern basins of the Soviet Union (1).

A considerable part of the Pechora coal is shipped to the Leningrad, Arkhangel'sk, Vologda, Murmansk, Kirov and Gor'kiy oblasts. The most valuable coking coal for the most part is thus far not being used for its proper purpose, i.e. it goes for coking only in the coke-chemical department of the Cherepovets steel plant and the Leningrad coke-gas plant. The use of Pechora coking coal for other than its proper purpose causes losses to the Soviet economy. The problem of its rational utilization is most important for development of the Pechora basin.

It is quite natural that the idea of linking the Pechora coking coal with the iron ore of the Urals should have arisen. More than 30 million tons of coal, mainly coking coal, now moves each year to the Urals from the Kuzbas and Karaganda. With the expansion of the South Urals steel plants (Magnitogorsk and Chelyabinsk), which will operate to a considerable extent on Kustanay ores, shipments of coking coal will increase , thus straining even further the railroads leading from Siberia and Kazakhstan to the Urals.

The strain on the railroads and the rationalization of transportation between the Urals and Siberia can be reduced to a certain extent by developing local Ural coal mining and by the construction of gas pipelines leading to the Urals from Bukhara, the Volga Region (Saratov and Stalingrad oblasts), Dzhebol (Komi ASSR) and other deposits. This would considerably reduce the strain on the energy balance of the Urals and make it possible to reduce to a minimum, and perhaps even eliminate entirely, the shipment of steam coal to this region. But the Urals will always need coking coal, judging from everything, and for this reason two variants have been proposed for the construction of a railroad from the Pechora to the Urals -- an eastern and a western one.

According to the eastern variant, the Ural-Pechora railroad would run along the line Vorkuta-Podgornoye (near Labytnangi)-Polunochnoye through virtually undeveloped regions. The length of the railroad route Vorkuta-Nizhniy Tagil would be 1,484 km. The eastern variant requires the building of a new railroad 800 km. long under the difficult conditions of the Arctic regions.

According to the western variant, the Ural-Pechora railroad would run via Ukhta—Troitsko-Pechorsk—Solikamsk. In this variant, the route Vorkuta-Nizhniy Tagil would be 253 km. longer and would amount to 1,737 km., and coal shipments from Vorkuta to Ukhta (about 700 km.) would have to pass over the already overburdened Pechora railroad. But, in compensation, the length of new railroad would be only 545 km., i.e., 255 km. shorter than the eastern variant; it would pass through comparitively well settled regions rich in petroleum, gas, shale, salt and timber, and would promote the development of these resources.

The advisability of building the Ural-Pechora railroad according to the eastern or the western variant depends on many factors thus far still inadequately clarified and analyzed, and it is quite understandable therefore that there are supporters of both the eastern and the western variants.

We will not attempt to analyze here the economic advantages of either variant of the railroad; we will only note that the iron ore reserves of the

Urals (10,079 million tons) constitute only 14.1 per cent of the Soviet Union's reserves, and that 3,900 million tons, or 39 per cent of the iron-ore reserves of the Urals, belong to the comparatively low-grade Kachanar titano-magnetite, containing 16-17 per cent iron on the average. The South Ural plants will operate to a considerable extent on Kustanay ores.

Special interest is presented by the possibility of opening up iron-ore deposits in the Polar and Subpolar Urals, as being the closest to the Pechora coal basin. Thus far, no large iron-ore deposits having industrial significance have been discovered in the Polar and Subpolar Urals, though some magnetic anomalies (Sirin, 1956) and numerous ore sites (Gromov, 1956) have been discovered.

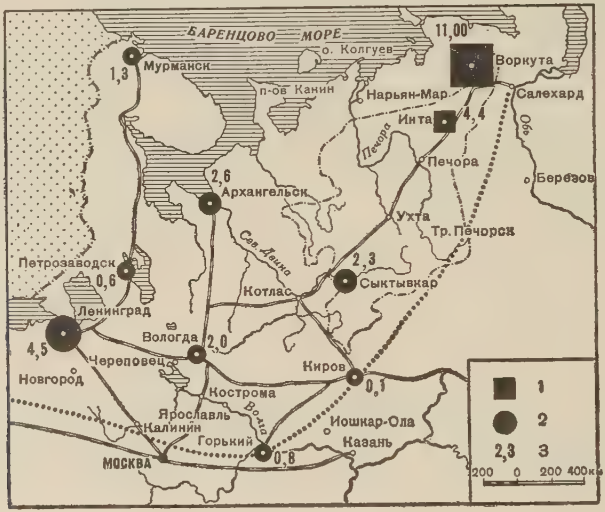

Fig. 1. Distribution of Pechora coal consumption.

1. Mining areas. 2. Consumption areas. 3. 1956 volume of production and consumption (in million tons), according to V. Changli and V. Shchukin, Pechorskiy ugol'nyy basseyn (The Pechora Coal Basin), 1957.

The iron-ore reserves of the Northern Urals are comparatively small and cannot insure any considerable development of ferrous metallurgy. Nonetheless, the problem of the further development of the Pechora basin is not eliminated by the absence of iron ores in the Polar Urals.

At present almost the whole flow of Pechora coal runs southwestward to Kotlas, where it branches out in different directions. Part of the coal is transported on the Pechora to Nar'yan-Mar and on the Northern Dvina to Arkhangel'sk.

If the planned connection between the Pechora, Vychegda and Kama is realized, Pechora coal may be dispatched by waterways to the Kama and Volga and, in particular, to Perm' Oblast, where millions of tons are needed. But for the Soviet economy as a whole it is important to expand the steel industry's consumption of the Pechora coking coal. And this requires finding a proper iron-ore base.

As of January 1, 1957, there were 71.7 billion tons of iron-ore reserves in the USSR, with 35.3 billion tons in categories A+B+C1. The European part (less the Urals) accounted for 43.4 billion tons (60 per cent of all reserves), and the Urals with Siberia and Kazakhstan for 28.3 billion tons (40 per cent of all reserves).

In the immediate vicinity of Pechora coal (in Komi ASSR and Arkhangel'sk Oblast), the reserves of iron ores are insignificant. There are considerable reserves of iron ore in the Kola Peninsula (1,659 million tons), but they are the raw-material base for the Cherepovets Steel Plant, which operates on Kola ore and Pechora coal.

The considerable iron-ore reserves of the Karelian ASSR (866 million tons) have thus far not been worked because of their less favorable geographic location and more complicated hydrogeologic conditions.

There are large reserves of iron ore in the South, at Krivoy Rog and in the Kerch' Peninsula, and especially in the Center of the European part of the USSR. In Kursk and Belgorod Oblasts, large reserves of easily concentratable ferrous quartzites and rich ores not requiring concentration (Zhelezorudnyye mestorozhdeniya, 1957) have been explored in the last few years. These ores are now being mined. Several organizations are working on projects for the building of mine shafts and other mining enterprises. Several individual deposits of this rich mining region (Yakovlevo, Gostishchevo, Mikhaylovo, etc.) have billions of tons of reserves, and the total reserves in Kursk and Belgorod oblasts amount to 15.2 billion tons. By 1965, 15 million tons of iron ore are to be mined per year in the Kursk Magnetic Anomaly (KMA) area.

In spite of complex hydrogeologic conditions, the mining cost of rich ores and the easily concentratable ferrous quartzites will be relatively low.

With the development of mining in the KMA area, the iron-ore base of the South and Center of the European part of the USSR will expand considerably, but all the iron ore mined will be complemented only by the Donets coal basin with its coking coal. The coupling of this iron ore not only with the Donbas, but also with the Pechora basin, would make it possible to advance the steel industry toward the Center, Northwest and North.

For the purpose of expanding the use of Pechora coking coal, it has been proposed hitherto to ship it chiefly to the Urals and this has given rise to the so-called Ural-Pechora problem. There have also been proposals for shipping Pechora coal southward to the ore of the Center.

Yeremin (1956) and Smirnov-Verin (1956) consider it possible to move Pechora coking coal south to the Tula and Lipetsk steel plants. To use this idea seems fundamentally sound and deserving of further study.

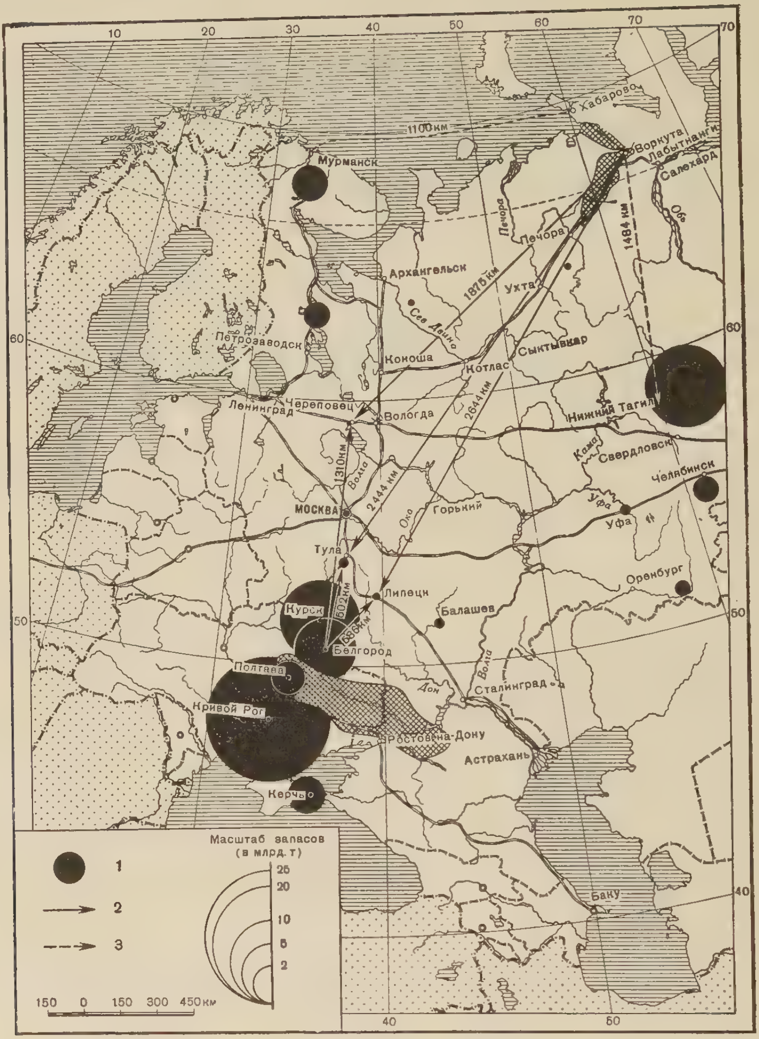

Fig. 2

Distribution of iron ore and coking coal in the European part of the USSR.

1. Iron ore reserves. 2. Shortest distance by existing railroads.
3. Shortest distance by projected railroads. (Legend): Reserves in billion tor

The distance from Vorkuta to Tula, where the northernmost blast furnaces of the Center are located, is 2,444 km.; the distance from Vorkuta to Lipetsk, 2,644 km. (2). It is unnecessary to state that, when the railroads running from the Pechora basin to the Center are converted into trunk lines, these distances will be economically shortened. Under these conditions, not only will the steel industry of the Center be considerably expanded (without additional burden on the Donbas), but the consumption of Pechora coal will also be increased.

The second way of expanding the consumption of Pechora coking coal is connected with the reconstruction of the raw-material base of the Cherepovets steel plant, whose operations are not economical, chiefly because of large raw-material transport costs. The movement of finished steel from the Cherepovets plant to the consumers is favorable because the steel can be shipped by waterways to Leningrad, Moscow, Gor'kiy and even Arkhangel'sk. But the movement of raw materials to the plant is considerably less favorable. One ton of pig iron requires 6,000 ton/km. of ore, coal and flux because the plant is 1,500 km. by rail from the ore and almost 2,000 km. from the coal. In the South, the smelting of one ton of pig iron requires only 75 ton/km. of raw materials (Bardin, 1940); in the Urals (except for the Magnitogorsk plant), 520 ton/km. (Berezov, 1933), and at the Kuznetsk and Magnitogorsk plants, 4,000 ton/km.

With such long hauls of ore and coal and the use of poor ores, Cherepovets pig iron costs 50 to 100 per cent more than the Southern and Ural pig iron. We will not touch here on the question of reducing the cost of Cherepovets pig iron; we will only note that one of the ways of doing this is to go over to the use of KMA ore, as has repeatedly been proposed (3). But in that case the ore of the Kola Peninsula will be left "hanging in the air". These ores can for a long period be recovered by surface mining with the use of drilling and blasting and yield high-grade concentrates, and the share of capital investment for mining operations there is considerably lower than at several other deposits.

The establishement of an integrated cycle at the Cherepovets plant (pig iron-steel-rolled metal) will greatly cut production costs of the plant. But at the same time it would be advisable to examine the question of the creation of a steel plant in the Komi ASSR (near Pechora or Ukhta), which would operate on Pechora coal and Kola Peninsula ore. In this case raw-material hauls would be reduced and the empty cars going to the Pechora basin for coal would be loaded to a certain extent.

The capacities of the Cherepovets and Komi steel plants should, of course, be tied in with the metal requirements of the North and Northwest of the European part of the USSR and perhaps the adjacent regions of the Center and the Baltic Republics.

The question of building a steel plant in Gor'kiy on the basis of the ore of the Center (KMA) and Pechora coal, may be raised in the more distant future. All this will considerably expand the consumption of Pechora coal for coking.

We think that new opportunities for the development of the Pechora basin will be opened after the building of the railroad from Vorkuta to the

Barents Sea. The building of this railroad has long been envisaged, but has still not been realized. It seems to us that this question has now become topical and that there are sufficient objective premises that make the building of the railroad not only economically advisable, but vitally necessary (Vasil'yev, Polevoy, 1958). These premises are the following:

(1) Until recently the most complex question for the organization of the movement of Pechora coal to the North was the brief duration of the navigation season. With the use of powerful icebreakers the navigation season can now be prolonged to eight months. Yet in such a large seaport as Arkhangel'sk navigation lasts only about seven months.

(2) In view of the fact that a railroad has already been built from Vorkuta to the mouth of the Ob', the Vorkuta-Barents Sea railroad will provide an outlet for the exportation of Siberian lumber and some grain from the basin of the Ob' and Irtysh Rivers. The possible annual export of lumber amounts to millions of cubic meters and the advisability of shipping lumber by that route has been advanced repeatedly by the Main Administration of the Northern Sea Route and the Arctic Institute.

Large industrial centers on the Ob' such as Novosibirsk, Barnaul and Biysk, and on the Irtysh, such as Ust'-Kamenogorsk, Semipalatinsk, Pavlodar and Omsk, would receive a new outlet to the North and Northwest of the European part of the USSR with the construction of the Vorkuta-Barents Sea railroad.

(3) The Vorkuta-Barents Sea railroad will make it possible to haul Pechora coal by cheap sea routes to Arkhangel'sk, Murmansk and other ports of the White and Barents Seas, and for export to Scandinavian and other European countries. Water transportation, especially by sea, is considerably cheaper than rail transportation. The biggest United States steel plants, situated on the Great Lakes, receive iron ore only seven months in the year from Lake Superior deposits1,500 to 2,000 km. from the plants. A number of large United States steel centers have arisen at the junction of cheap waterways, over which the ore travels, and railroads, over which the coal is hauled.

Because of the high degree of mechanization of loading and unloading and the large tonnage of vessels plying the system of the Great Lakes, the hauling of ore by water is ten, fifteen and twenty times as cheap as by railroad.

Yet at the same time millions of tons of Pechora coal are being transported to the North and Northwest by railroad over great distances (the distance from Vorkuta to Arkhangel'sk is 1,966 km., from Vorkuta to Leningrad, 2, 354 km.; from Vorkuta to Murmansk, 2,858 km). The hauling of a large part of the coal by sea would result in considerable savings in transportation costs.

A. Ye. Fersman once mentioned the possibility and desirability of moving Pechora coal to the Kola Peninsula by sea, but at that time considered that route difficult to put into operation (1941, pp. 221-222). If a steel plant is built in the Komi ASSR, shipments of Kola ore by combined rail and sea routes would still not be advisable at present; but in the more distant future, when a steel plant has been built on the Kola Peninsula, the hauling of Pechora coal to the Kola Peninsula by sea would considerably cut costs of producing Kola steel.

But the combination of Kola ore and Pechora coal, whatever the best location for such a steel plant may be, is only one of the many possible combinations of the mineral wealth of the Kola Peninsula with that of the Pechora basin.

Academician A. Ye. Fersman noted that the Kola Peninsula and the Ukhta-Pechora area had mining complexes that were mutually complementary. The Kola Peninsula "contains almost exclusively deep-seated magmatic formations and associated metamorphic formations at great depths"; the Ukhta-Pechora area "lacks that type of geochemical processes entirely and contains instead typical formations of the sedimentary series with complex geochemical processes" (Fersman, 1940, p. 149).

Speaking of the mineral wealth of the Kola Peninsula, A. Ye. Fersman wrote: "Twelve minerals here exist in reserves of immense industrial value hitherto unparalleled in the world. Among the non-metallics are: Apatite, nephelite, kyanite, ceramic granite, olivinite, abrasive granite; and among the metal ores are: iron, titanium, nickel, niobium, rare earths, and zirconium" (Fersman, 1941, p. 257).

Which of these varied minerals could be mobilized if Pechora coal went to the Kola Peninsula in a broad flow by the cheap sea route, and what advantages would the national economy receive from it?

We will attempt here to discuss all the possible combinations and types of production that could be created. We will only note certain basic factors and possible lines of development.

(1) Pechora coal would be hauled to Arkhangel'sk and Murmansk mostly by the cheap sea route, not by rail, and this alone would bring great advantages to our economy.

(2) The Vorkuta-Barents Sea railroad would make it possible to ship Pechora coal abroad. Lately, the United States has been exporting 35 to 40 million tons of coal a year to Europe. That coal is imported not only by such countries as France, which has always been a coal importer, but even by countries like the German Federal Republic with its Ruhr coal basin, by Britain, Belgium and a number of other countries.

(3) Non-ferrous metallurgy is one of the leading branches of the in-

dustry of the Kola Peninsula. The production of nickel, copper and other metals could be considerably increased.

(4) The production of titanium, rare metals, niobium (tantalum), vanadium and zirconium could be organized on the Kola Peninsula.

(5) The apatite of the Kola Peninsula, which in terms of reserves belongs to the world's great deposits, represents a complex ore, which could yield raw materials for phosphate fertilizers and strontium and fluorine. The nephelite left in the tailings from the concentration of apatite yields a number of chemical products, particularly alumina.

(6) The Kola Peninsula contains large reserves of aluminum raw materials --nephelite and kyanite--and it may prove advisable to use not only nephelite, but also kyanite, which has a higher alumina content, for the production of alumina.

The large amount of Portland cement obtained incidentally in the production of alumina from nephelite can be shipped by cheap waterways to Leningrad, the Baltic Republics and other regions.

We thus see how broad and varied are the possibilities of industrial development of the Kola Peninsula, once Pechora coal can be delivered there cheaply by sea. No less broad are the possibilities for the industrial development of the Komi ASSR and the whole North of the European part of the USSR that would result from the more rational utilization of Pechora coking coal (Vityazeva, 1957, Shishkin, 1957).

The first step in the development of the Pechora basin and the whole complex of industrial and other enterprises connected with it is the building of a railroad to the Barents Sea and of a steel plant in the Komi ASSR on the basis of a combination of Pechora coking coal and Kola iron ore. The author realizes that large enterprises such as steel plants and new railroads and ports requiring billions in capital investment are not built with one stroke of the pen, but he will consider his aim fulfilled if this study serves as an impetus for further discussion of ways of developing the Pechora coal basin and, in general, the economy of the North and Northwest of the European part of the USSR.

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Footnotes

1. The production cost of a ton of coal in 1956 was, in rubles:

Donbas	90.96	
Pechora basin	90.80	
Kuzbas	60.76	
Karaganda	58.33	(Sherstnev, 1957, p. 21).

2. The distance from Osinovka in the Kuzbas to Serov in the Urals is 2,324 km,; to Nizhniy Tagil, 2,110 km.; to Magnitogorsk, 2,266 km.; to Orsk, 2,408 km.
3. Thus, for example, noting the immense reserves of ferrous quartzite and rich ores in the KMA, Academician D. Shevyakov and G. Man'kovskiy write: "In the future, we can also raise the question regarding the supplying of the plants of the northwest of the European part of the USSR with ore from these deposits" (1957, p.45). Mining Engineers Kudryashov, Radziyevskiy and Biryukov write that the cost of hauling ore to the Cherepovets steel plant from the Olenegorsk mine in Murmansk Oblast is 60.7 per cent higher than from the KMA (Promyshlenno-ekonomicheskaya gazeta of September 4, 1957).

WAYS OF DEVELOPING THE PRODUCTIVE FORCES OF EASTERN SIBERIA

By V. A. Krotov, M. I. Pomus and G. D. Rikhter

(From Izvestiya Akademii Nauk SSSR, seriya geograficheskaya, 1959, No. 1, Pages 52 - 63).

The theses of the report by Comrade N. S. Khrushchev before the coming 21st Congress of the Communist Party outline a vast program for the further economic and cultural growth of the Soviet Union and the raising of the level of prosperity of the Soviet people.

The seven-year plan for the development of the national economy of the USSR in 1959-1965 provides for the economic development of natural resources, especially in the eastern regions, where the largest power and raw-material resources are concentrated under advantageous conditions for development.

The utilization of the natural resources of the eastern regions will permit the mobilization of vast reserves for the rapid realization of the historic task of creating the material and technical bases of communism.

Further eastward advances of industry are bringing industry closer to effective sources of raw materials and power that raise labor productivity, accelerate the rate of growth of productive capacities and increase the output of the most important branches of the national economy, which means gaining time in the peaceful economic competition with capitalism.

The eastward movement has proceeded in successive stages, the first of which embraced the Volga and the Urals and the second Western Siberia, Kazakhstan and Central Asia. In the third stage, which began mainly in the post-war period, a struggle has been waged for the development of the productive forces of Eastern Siberia.

Studies of the natural resources of Eastern Siberia, made in recent years by scientific, designing and prospecting, and geologic exploration institutions, have disclosed sources of water power, fuel and mineral raw materials unique in reserves and technical-economic indicators, as well as vast reserves of high-grade timber and new land suitable for agriculture from the viewpoint of soil and climate.

In August, 1958, a conference was held in Irkutsk on the development of the productive forces of Eastern Siberia. It was organized by the Academy of Sciences of the USSR jointly with the State Planning Committee of the USSR and the Council of Ministers of the RSFSR with the participation of the local party, governmental, planning and economic organizations of Krasnoyarsk Kray, Tuva Autonomous Oblast, Irkutsk Oblast, Buryat Autonomous SSR, Chita Oblast and Yakut Autonomous SSR. The conference was preceded by regional meetings held in Krasnoyarsk, Kyzyl, Irkutsk, Ulan-Ude, Chita and Yakutsk, where concrete questions of the prospective development of the individual economic administrative regions of Eastern Siberia were discussed.

At the conference and the regional meetings, 8,000 scholars and specialists in all branches of the national economy summed up results and set objectives for further research and exploration on problems of development of the natural resources of Eastern Siberia. The conference heard a technical and economic evaluation of water-power, fuel and mineral resources, forest resources, land reserves and other natural conditions of Eastern Siberia. The conference also discussed prospects for the development and distribution of the most important branches of industry, agriculture and transportation, industrial complexes and production centers of Eastern Siberia for the next seven years and the period of the over-all fifteen-year plan.

The proceedings of the conference provide evidence that Eastern Siberia is one of the economic regions of the Soviet Union richest in natural resources. It contains more than 70 per cent of the bituminous and brown-coal reserves and half of the water-power resources of the country. The prospective reserves of iron ore are estimated at 12 to 15 billion tons. Eastern Siberia also has some of the largest Soviet deposits of nickel and cobalt, tin, tungsten and molybdenum, gold, diamonds, mica, asbestos, graphite, talc, magnesite, salt, aluminum raw materials and other minerals. It also has half the country's timber reserves and large reserves of agricultural land.

The combination of rich fuel, power and raw- material resources creates exceptionally favorable conditions for a thorough and integrated development of productive forces.

The most important characteristic of the natural resources of Eastern Siberia is their high effectiveness of exploitation. In comparison with other economic regions, Eastern Siberia stands out as a region of the cheapest power and solid fuels. The production cost of electric power from the Angara and Yenisey hydroelectric stations, according to design data, is 2.5 to three times lower than at the largest Volga stations. Brown coal, mined in surface mines in Krasnoyarsk Kray, when translated into conventional fuel units, is five times cheaper than Donbas coal and three times cheaper than Kuzbas coal. The iron ore of a number of deposits, particularly Zheleznogorsk (Korshunikha) will be the cheapest in Siberia, and the steel plants planned on the basis of the ore will, according to present estimates, yield one of the cheapest pig irons in the country. The aluminum of the Krasnoyarsk plant, now under construction, will also be the cheapest in the Soviet Union.

The possibility of exploiting the natural resources of Eastern Siberia with low labor inputs is especially significant because of the relatively sparse population of the region and its labor shortage. The low production costs permit Eastern Siberia to stand the high transportation expenses connected with the region's remoteness from the main economic centers of the country.

The presence of large and cheap sources of power and diversified high-grade raw-material resources permit the creation in Eastern Siberia of a new, powerful industrial base capable of undertaking a considerable share of the tasks set before the eastern regions of the country.

The conference in its resolutions outlined ways to make the most suitable use of the natural wealth of Eastern Siberia and suggested directions of development of the region's productive forces.

In keeping with the character of its natural resources, Eastern Siberia must act in the interregional distribution of labor primarily as a major producing region of cheap power and fuel and of manufactured goods requiring cheap electric power and fuel. The existence of favorable natural conditions suggests the advisability of establishing, with the most modern technology and at economically suitable locations, a number of appropriate types of production on a scale almost impossible in other parts of the country.

The availability of the Soviet Union's cheapest thermal and hydroelectric power can be used as a basis for the production of light metals, ferroalloys, synthetic materials, especially high-polymer products, and other manufactures requiring a large amount of electric power and fuel with comparatively little labor input. The power resources of Eastern Siberia make it possible not only to convert the region into the main Soviet base of power-oriented manufacturing industries, but also to insure the transmission of considerable amounts of electric power to Western Siberia and the Urals.

Along with this principal specialization in the interregional distribution of labor, Eastern Siberia must retain an important place in the national economy of the USSR in a number of segments of industry based on the region's enormous raw-material resources.

A new major branch of industry will be steel. The metallurgy of light and heavy nonferrous and rare metals will expand. In addition to metallurgy and the chemical industry, Eastern Siberia will also specialize in mining and lumbering. Eastern Siberia will play a leading role in the mining of diamonds, gold, mica, graphite, fluorspar, asbestos, rare metals and widely disseminated elements. The forest wealth insures the possibility of converting Eastern Siberia into a major supplier of wood and wood products not only for other economic regions of the country, but also for export.

The interests of the integrated development of Eastern Siberia's economy require the creation of large machine-building and metal-fabricating centers as well as centers for the production of building materials.

Along with the broad development of the branches of heavy industry, greater development must also be provided for the branches of light industry, which will be promoted in particular by the creation of a large chemical industry in Eastern Siberia. The impending growth of population will require the further development and intensification of agriculture and of the food industry.

Among the most important problems in the development of the productive forces of Eastern Siberia are the integrated development of transportation and the liquidation of the serious lag of transport construction behind the rate of industrial development and the tasks of developing new regions rich in natural resources.

The realization of this program of development of the productive forces of Eastern Siberia will result in a new economic geography of this vast territory. Great new industrial centers will arise and develop; existing cities and workers' settlements will expand and new ones will rise; the East Siberian countryside will greatly change in appearance; and new territories of Eastern Siberia will be drawn into intensive economic development.

Energy is the central factor in the economic development of Eastern Siberia in the next seven years and beyond. The outstanding role of electric power is linked with the specialization of the region in energy-oriented types of production and with the presence of large and very economical power resources.

The area contains more than six trillion tons of coal and more than 90 billion kilowatts of potential hydraulic energy.

Large coal seams extend along the densely inhabited railroad zone of the region and spread over the boundless expanse of Eastern Siberia to the north and to the south of the railroad. Many deposits have thick coal seams close to the surface, which makes surface mining possible at some mines at the rate of 20 to 25 million tons of coal a year with a low production cost of 6 to 12 rubles per ton (in the Kansk-Achinsk basin). These conditions favor the mining of steam coal, almost entirely in surface mines in the areas of Kansk-Achinsk (Nazarovo, Irsha-Borodino), Minusinsk (Chernogorsk), Irkutsk (Azeyskoye near Tulun) and Cheremkhovo, in Transbaykalia (especially Gusino ozersk and Kharanor), in some areas of Yakutia and at Noril'sk.

On the basis of these coal deposits, thermal electric stations with capacities of 1.5 to 2.4 million kilowatts can be created. Here, as in some areas of Kazakhstan and Western Siberia, the Soviet Union's cheapest thermal electric power will be obtained. The cost of electric power at many stations will be almost equal to that of large hydroelectric stations (except the Angara and Yenisey stations). After 600,000-kilowatt turbines are installed, the cost will be still lower. One of these stations is already being built near Achinsk, at the Nazarovo brown-coal deposit.

Eastern Siberia is becoming the Soviet Union's leading region of hydroelectric power production. The major East Siberian rivers, having the largest river discharges in the USSR, carry an enormous volume of water. The Yenisey in its lower course carries 548 cubic kilometers of water a year, twice as much as the Volga. Many of the rivers also have a steep gradient (on the Angara it averages three times that of the Volga). The hydroenergy resources are also marked by concentration of potential capacities in certain river sections, and by steady year-round flow. Construction of large electric stations is favored by geologic and geomorphic conditions, such as hard rocks on river banks and bottoms, a combination of gorges, lakelike widenings and high banks, limiting the flooded area behind dams. At such stations the cost of power fluctuates between 0.5 (or less) and 1.5 kopecks per kilowatt-hour; at the same time the stations require the Soviet Union's lowest capital investment per installed kilowatt.

Especially favorable are conditions for the construction of hydrostations on the Angara and the Yenisey. The first unit on the Angara River, the Irkutsk hydroelectric station (660,000 kw.), is already working at full capacity. In the present seven-year period the Bratsk hydroelectric station, with a capacity of 3.6 million kw. (since raised to 4.5 million kw. -- Editor, Soviet Geography) will go into operation, and the Krasnoyarsk Hydroelectric Station, with a capacity of 4 million kw. (since raised to 5 million kw.-- Editor, Soviet Geography), will be built; the biggest units in the Angara-Yenisey system will arise, particularly the very economical and large Yeniseysk (up to 6 million kw.) and Ust'-Ilim stations. Large and economical hydroelectric stations can also be built on the Amur, the Zeya and the Selenga.

In the south of Siberia, from Lake Baykal to Novosibirsk, electric stations will be linked in the seven-year period into a single power system, which will gradually embrace the adjoining parts of Siberia. Ultimately, the cheap electric power of Eastern Siberia will be transmitted to the Urals as well.

At the same time, Eastern Siberia will become a region of liquid and gaseous fuel production. At a number of places the geologic structure seems to favor the occurrence of petroleum and gas deposits, but for the time being the production of petroleum products in Eastern Siberia is being organized on the basis of crude oil sent by pipelines from the Volga-Ural region.

Refineries built along the pipelines will supply Eastern Siberia and the Soviet Far East with liquid fuel. In addition the exploitation of gas deposits will begin. Large natural gas reserves discovered at the mouth of the Vilyuy can be used to supply the central part of Yakutia.

The great power base and the presence in Eastern Siberia of rich iron-ore deposits open prospects for the creation of an iron and steel industry. Confirmed iron-ore reserves alone now amount to 5.3 billion tons. In addition, a number of places, especially Transbaykalia, contain large deposits of titanomagnetite with up to 20 per cent iron and large amounts of vanadium and phosphorus. With cheap power, these ores can also be used in blast furnaces yielding important by-products. The largest iron-ore deposits with 30 to 50 per cent iron are found on the lower Angara (the Angara-Pit iron-ore basin, with more than 40 per cent of the confirmed reserves), along the middle Angara and Ilim 17 per cent, in Khakassia 9 per cent, in eastern Transbaykalia 9 per cent, in the south of Yakutia 15 per cent, in the basin of the Nizhnyaya Tunguska and to the north of it, and also in Tuva.

On the basis of the easily concentratable and smeltable ores of the Zheleznogorsk (Korshunikha) deposit, situated along the Tayshet-Lena railroad, the first large steel plant in Eastern Siberia is to be built at Tayshet. At first it will operate on Kuznetsk coking coal, which has to make a run of 1,000 km. to the plant on the Stalinsk (Medzhdurechensk)-Abakan-Tayshet railroad. For the purpose of relieving the Kuzbas, which will remain the main base of coking coal for Urals and Siberia, coal should be obtained increasingly from the Sayan-Partizanskoye, and a number of Irkutsk deposits, which, according to preliminary studies, are suitable for coking in their entirety, or in part with a mixture of Kuznetsk coal.

Later additional steel plants may be set up on the basis of Angara-Pit hematite ore (with roasting and magnetic concentration), and Transbaykal and Yakut deposits, for which the large coal deposits of the Southern Yakut (Chul'man) basin will be the coke base. This basin contains billions of tons of fine coking coal, of which 77 per cent are of fat rank and 19 per cent of coking rank. The coal is low in sulfur and contains almost no phosphorus. At a number of places, pig iron and steel could be smelted in electric furnaces, including the Tayshet steel plant.

Even now the use of rich deposits of nonferrous and rare metals is playing an important role in Eastern Siberia. In the near future nonferrous metallurgy will occupy an even larger place in the economy of the region. Eastern Siberia will become one of the main producers of aluminum, magnesium and other light metals. In addition to the Irkutsk aluminum plant, now under construction, the Krasnoyarsk plant will be set up on the basis of nephelite. The electrothermal production of aluminum will be based on the Kyakhta sillimanite shale.

Eastern Siberia will in the near future become one of the most important bases in the country for the production of chemicals, again based on cheap hydroelectric and thermal power and a variety of raw materials, partly local and partly shipped in. Eastern Siberia will produce plastics, man-made fibers, synthetic rubber, rubber goods, chlorine-containing substances, soda ash and caustic soda, mineral fertilizers and a multitude of other chemical products.

The creation in Eastern Siberia of ferrous and nonferrous metal production on a large scale and the growth of industry, agriculture, transportation and urban and rural construction will bring about a broad development of machine building and metal fabrication. The specialization and structure of the metal-working industry will reflect the industrial needs of the regional economy. Stress will be put on production of equipment for nonferrous and ferrous metallurgy, for the mining, chemical and lumber industries, for the construction of highways and, in part, on farm-machine construction. Eastern Siberia will become a center for the production of automobiles, machine tools, power-generating machines and electrical equipment.

The machine-building plants should be distributed in clusters of interrelated enterprises with common sources of raw materials and power, common suppliers of castings and forgings, common means of transportation, and joint experimental and designing institutions. The plants will arise and develop primarily along the main transportation axis of the region, the Trans-Siberian Railroad, which has the most favorable conditions for the provision of raw materials and semi-manufactured goods, for subcontracting to other machine-building centers and for the shipping of finished products, as well as stable sources of water supply. Machine-building plants will also arise to the south of this trunk line: in the Khakass-Minusinsk basin, in southern Buryatia along the Ulan-Ude--Naushki railroad, and in southeastern Transbaykalia.

One of the leading natural resources of Eastern Siberia is the forest spreading over an area of 338 million hectares. In the southwest, as far as Lake Baykal and in parts of Transbaykalia, large areas are occupied by pine; elsewhere larch predominates. The most valuable forests are situated south of 60 ° N. The volume of logging operations is growing rapidly: in 1956 it reached 43 million cubic meters.

Eastern Siberia is supplying wood to many sparsely wooded or unforested regions of the country, and in the future its role in this respect will expand. It will become the Soviet Union's main base of wood production. Considering the remoteness of Eastern Siberia from the other lumber-consuming regions and the necessity for a rational and economically efficient use of the timber reserves, the shipping of unprocessed lumber should be reduced to a minimum. Eastern Siberia should furnish not only pit props, round wood, sawnwood and ties, but also prefabricated homes, box boards and various products of the chemical processing of wood, such as cellulose, paper, paperboard, alcohol, rosin, turpentine and flotation oils. The main logging bases must be shifted from the Trans-Siberian Railroad into the forest, chiefly into the regions of the middle Yenisey, lower and middle Angara and, in part, the upper Lena, to the northern slopes of the central part of Eastern Siberia and the valleys of the eastern shore of Lake Baykal.

Large wood-processing centers will be created along the Yenisey, below the confluence of the Angara (Maklakovo-Yeniseysk), and in the basin of the middle Angara (Bratsk-Chuna), where several million cubic meters of wood will be processed at large processing and chemical plants. Timber-industry centers will also be created in other parts of Eastern Siberia, particularly near Lake Baykal.

The rapid development of the productive forces of Eastern Siberia will be reflected in the volume and rapid rate of capital construction. The volume of capital investments in the economy of Eastern Siberia will almost triple by the end of the seven-year period compared with 1958. To insure the planned volume of construction, the building industry and the production of building materials must first be properly organized.

These tasks must be solved under complex natural-geographic and economic conditions: low winter air temperature, the presence of permafrost and earthquakes in a number of areas, the dispersed character of construction, scattered over a vast territory and often carried on in sparsely inhabited regions inadequately provided with transportation routes.

In this connection, special importance is attached to regional planning for the prospective industrial areas so that these plans may be used as a basis for the distribution of industrial enterprises, transportation and engineering projects, population centers and institutions for cultural and economic services. Such plans have already been worked out for the Irkutsk-Cheremkhovo area and the areas of the Bratsk and Krasnoyarsk hydroelectric stations.

Eastern Siberia has the necessary mineral and raw-material base for the creation of a building-materials industry that will supply basic building materials to construction projects. A large cement industry will arise in Krasnoyarsk Kray on the basis of the use of by-products from the processing of nephelite at the Achinsk alumina plant. Cement plants will be built in Chita Oblast and Yakut Autonomous SSR.

The present level of agriculture is inadequate for the needs of the population of Eastern Siberia. Only a small amount of grain is shipped to other economic regions, and butter and other farm products in large quantities are shipped in from outside Eastern Siberia. Because of the planned increase in population, the demand for farm products will grow further.

The most important tasks of agriculture in Eastern Siberia are: the further development of grain growing with emphasis on spring wheat; expansion of industrial crops, vegetable and potato production; rapid development of beef-dairy cattle or specialized beef breeds; hog and poultry raising; and the raising of merino and crossbred sheep in the southern steppes of Chita Oblast, Buryatia, Tuva and Krasnoyarsk Kray. In Yakutia and in the north of the Krasnoyarsk Kray, reindeer raising will continue to be of great importance.

An analysis of the natural condistions and resources of agriculture of Eastern Siberia shows that the present volume of production of agricultural products can be increased in the coming years by 1.5 times in grain, by 2.5 to 3 times in meat, milk, eggs and wool, and to a still greater extent in vegetables and potatoes. The land reserves of Eastern Siberia, where there are still more than 16 million hectares of undeveloped arable lands with good soils, will make it possible to increase the cultivated area from 7.8 million hectares to 10 or 11 million hectares, accordingly expanding the sown areas by about 50 per cent. The experience gained in developing more than 2 million hectares of virgin and idle lands in Krasnoyarsk Kray and in Irkutsk and Chita oblasts during 1954-1957 illustrates the potentialities of further expansion.

The development of new lands will require an expansion of irrigated areas and the supplying of water to pasture lands, especially in the arid regions of Khakassia, Tuva and Transbaykalia.

The strict observance of rotation of crops and farm-work periods and methods prescribed by modern techniques for the given soil and climate conditions, the wide employment of mineral fertilizers and the integrated mechanization of agriculture will insure a rise in crop yields. The creation of a firm feed supply and improvement in livestock breeds will make it possible to raise the productivity of animal husbandry simultaneously with an increase in livestock numbers.

For the tundra, tayga and mountain-tayga, occupying about 90 per cent of the territory of Eastern Siberia, the hunting of fur-bearing animals and fur-farming are of great importance. Eastern Siberia yields about 50 per cent of the Soviet Union's furs, will continue as the chief supplier of furs for the domestic market and for export.

Transportation is of special importance for the development of the productive forces of Eastern Siberia. The overcoming of distance is the most important task for the region, which is remote from the most important economic regions of the country and from ice-free seas, and whose population and industrial centers are widely dispersed over a vast area. Transportation is the "bottleneck" that restricts the rate and level of development of the productive forces and retards the development of natural resources. The railroad net of Eastern Siberia is eight times as thin as for the Soviet Union as a whole. Only 14 per cent of the navigable sections of rivers are used for navigation. The reconstruction of the railroad transportation system of Eastern Siberia that is being carried on or is planned for the coming years, and the electrification of the whole main line of the Trans-Siberian Railroad, will considerably raise the carrying capacity of the railroad net. Nevertheless, it will not provide beyond 1965 for the growth of freight traffic, which will increase by about three times over the present level. New outlets from Eastern Siberia must therefore be created, both in a westerly and in an easterly direction, to relieve the Siberian trunk line of transit freight. Such new outlets may be the continuation of the South Siberian Railroad from Abakan via Tuva and the Eastern Sayan Mountains to the southern end of Lake Baykal and eastward into the Borzya area, and the North Siberian railroad from the mouth of the Angara around the north end of Lake Baykal into southern Yakutia and eastward to the Okhotsk Sea. The building of these railroads must be preceded by the construction of the following lines: Achinsk-Abalakovo, Abakan-Tayshet, Abalakovo-Usovo, and Bam-Chul'man-Aldan, which will link the main line with the important areas of minerals and forest resources.

Of great significance for the integrated development of transportation and especially for the development of remote regions will be the further expansion of the network of waterways and the development of river transportation on the Yenisey, Angara, Lena and their tributaries. There is urgent need for the organization of navigation on the upper Yenisey to insure transportation to the Tuva Autonomous Oblast. The hydroprojects now being built or projected on the Angara and Yenisey should provide locks to insure through navigation on these important waterways.

Of no less significance for the liquidation of the prevailing lack of transportation routes is the building of new automobile roads and the improvement of the existing ones.

Air transportation plays an important role in Eastern Siberia: without it, the industrial development of many northern regions and the organization of rapid communications with other regions would be inconceivable.

One of the most important problems of the economic development of Eastern Siberia is that of population. At present, only about 7 million persons live in Eastern Siberia, on a territory exceeding 7 million km. The lack of labor resources retards the rate of industrialization, the development of agriculture and transportation construction in Eastern Siberia.

The intended volume of capital construction and industrial development in Eastern Siberia calls for an approximate doubling of the population in 10 to 15 years. For this reason, questions of attracting a labor force, of organizing migration to Eastern Siberia and of settling its territory are of prime importance.

The new geography of production that will be taking shape in Eastern Siberia in the next 15 to 20 years will be characterized not only by the creation of individual industrial centers and transportation lines, but also by the formation of whole territorial-production complexes combining a number of production bases, industrial plants and associated enterprises, sources of raw materials and power, and agricultural bases. These territorial-production complexes will be the basis for a new integrated general economic (economic-geographic) regionalization of Eastern Siberia.

The economic regionalization of Eastern Siberia now in prospect is characterized primarily by the formation of the great Angara-Yenisey economic-geographic region within Eastern Siberia, and by the inclusion of eastern Transbaykalia and the Yakut ASSR in the orbit of the Far Eastern economic-geographic region.

The Angara-Yenisey complex specializes in the development of electricity-oriented and fuel-oriented branches of industry, chemistry, wood processing, production of electric power for transmission to other regions of Siberia and the Urals, a number of branches of machine building, and agriculture, particularly grain farming.

Within this great complex are territorial-production complexes of smaller sizes. One of the most important is the Krasnoyarsk complex, situated in the Achinsk-Krasnoyarsk-Kansk zone. The area will have a large power-generating complex based on Kansk-Achinsk coal and the power of the Krasnoyarsk hydroelectric station, large enterprises of the nonferrous and ferrous metallurgical industry and of the chemical industry, particularly for the production of artifical fiber and synthetic rubber, and large-scale machine building.

Farther south is the South-Yenisey territorial-production complex, combining large-scale agricultural production with considerable possibilities for industrial development along the lines of mining and forest industries, the production of light metals (possibly, in the future, also ferrous metallurgy), chemicals, metalworking and processing of farm products.

To the north of the Central Krasnoyarsk complex, the Lower-Angara complex is to be created after the current seven-year plan, with a large production of cheap water power, power-oriented branches of nonferrous metallurgy, electrochemicals, and the largest diversified wood-processing plant in the country. The near-by Bratsk-Tayshet region will be based mainly on cheap water power and will specialize in electrochemicals, power-oriented nonferrous metallurgy, production of cellulose, artificial fibers and wood processing. A large steel and wood-processing center with considerable machine building is being created already in this seven-year period.

The currently best developed industrial-territorial complex is the Irkutsk-Cheremkhovo region, which has coal industry, nonferrous metallurgy, machine building, chemical processing of coal, petroleum and other minerals.

The northern part of the Angara-Yenisey region already contains two industrial areas specializing in the processing of local mineral resources. They are the Lena-Vitim area with extraction of mica, muscovite and gold; and the North-Yenisey area, with two large isolated industrial centers: Noril'sk (nonferrous metallurgy) and Igarka (lumber exports).

East of Lake Baykal, the Central Buryat (Selenga) complex is being created, with prospects for the production of light and rare metals and their alloys, machine building, chiefly transportation machinery, a chemical industry based on wood and coal processing and well developed animal husbandry.

Farther east will be the East Transbaykal complex based on the water power of the upper Amur, the thermal power of Kharanor, with nonferrous metallurgy, and the possible creation of a large steel industry.

In Yakutia the Aldan complex is taking shape, with the further development of gold and mica extraction and, possibly, the creation of a steel industry based on the high-quality coking coal of the South Yakut (Chul'man) basin and Aldan ore. The transportation axis of this region will be the railroad Bam-Chul'man-Aldan, which ultimately will be the initial link in the new Northeastern railroad.

To the northeast lies another great mining region, the Yana-Indigirka area. Special significance is attached to the Vilyuy (West Yakut) industrial area, which is becoming one of the largest diamond-mining centers in the world. Railroad construction will also add to the importance of the Central Yakut region, where even now the question of the development of a gas industry is being raised. It will be the base of supply for all of Yakutia and, in part, Magadan Oblast.

The prospects for the development and distribution of the productive forces of Eastern Siberia in the coming seven-year period and in succeeding years pose a number of important problems, in the solution of which the geographic sciences can assist substantially.

Some of the problems of geographic studies in Eastern Siberia have been discussed earlier (V. A. Krotov. "Development and distribution of the productive forces of Eastern Siberia and some tasks of geographic studies", Izvestiya AN SSSR, Seriya geogr., 1956, No. 4).

The present article will touch only on those scientific problems of geography that derive directly from the resolutions of the conference on the development of the productive forces of Eastern Siberia.

In spite of the great amount of work done under Soviet rule on the study of the natural-geographic conditions and resources of Eastern Siberia, by no means all of its territory has been studied with the required degree of completeness or detail, and the data available to us on natural resources are inadequate.

An important task in this connection is the making of an inventory of natural resources of Eastern Siberia and the determination of principles guiding their areal distribution. The joint efforts of geologists and geographers must produce a geological map of Eastern Siberia at 1:1,000,000 and smaller-scale geomorphic, geological-engineering and hydrogeological maps of Eastern Siberia as a whole and its oblasts. Scientists should work out a seismic and geological-engineering regionalization of Eastern Siberia and to conduct regional geophysical studies on a broad scale on its territory, paying special attention to the study of the principles of formation of permafrost in individual zones of Eastern Siberia. All this can provide a scientific basis for the prospecting and exploration of minerals, the working out of regional planning schemes, and the solution of complex construction problems under the conditions of Eastern Siberia.

The efforts of geographers must be concentrated on an integrated physical-geographic regionalization of Eastern Siberia and the compilation of a series of maps of the vegetation, soils and land reserves as a basis for agricultural regionalization and the delimitation of zonal systems of farm management. In the basic agricultural regions, detailed botanical, climatic and soil studies must be made with the object of further developing available land reserves, of raising the productivity of the land and carrying out some reclamation measures.

Among the integrated geographic problems, special attention should be given to Lake Baykal as a unique body of water with endemic species of animal life and a peculiar hydrologic regime.

Economic geographers are faced with a large number of problems relating to the distribution of the most important branches of the economy in Eastern Siberia, the specialization and integrated development of its economic administrative regions, and their place and role in the system of the interregional distribution of labor. All these questions should form a component part of the scientific hypothesis of the development of productive forces of Eastern Siberia, which must be worked out on the basis of the proceedings of the conference.

An important component part of this hypothesis must be the economic regionalization of Eastern Siberia and the study of the processes of formation of the territorial-production complexes and areas arising on its territory. For such regions of new development as the Vilyuy diamond-mining area, the area of the Bratsk hydroelectric station, southern Yakutia, the lower Angara and others, the integrated study of natural resources and conditions is a task that should be tackled without delay.

A thorough examination of all these problems calls at the same time for expansion of the work to be done by the Institute of Geography of the Siberian division of the Academy of Sciences of the USSR, which is to be created in Irkutsk. The geographic community must be mobilized for the study of the productive forces of Siberia. A great role in this respect can be played by a congress of geographers of Siberia and the Soviet Far East to discuss the most important problems of geographic science confronting the geographers of Siberia.

The experience of the conference on the development of the productive forces of Eastern Siberia shows the advisability of organizing similar conferences on other large economic-geographic regions of the country, primarily on the Soviet Far East and Western Siberia.

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WAYS OF DEVELOPING THE ECONOMY OF THE CENTRAL CHERNOZEM AREAS OF THE RSFSR

By K. V. Dolgopolov

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Fulfillment of the plan for the development of the Soviet national economy in 1959-1965 will be a decisive step in the creation of the material-technical base of communism and in the performance of the main economic task of the USSR. The 21st Congress of the Communist Party of the Soviet Union, which confirmed the new economic program of Communist construction, started from Lenin's statement that the correct distribution of productive forces over the nation's territory would contribute to attaining high labor productivity. For these purposes, the seven-year plan contemplates the further specialization and integrated development of the economy of the union republics and the major economic-geographic regions.

A special place among the regions of the European part of the USSR is occupied by the Central Chernozem region, which the seven-year plan has confronted with the task not only of reconstructing the existing enterprises and improving the specialization and subcontracting of industry, but also of exploiting large high-grade iron ore deposits (Kursk Magnetic Anomaly--KMA), urgently needed by the steel industry of the Center and South.

The present production structure of the Chernozem Center differs sharply from that of pre-revolutionary days. In the past, it was characterized by the absolute predominance of agriculture, which was in a state of chronic stagnation. The competition of the regions of the South and Center, industrially most important at that time, hampered the industrial development of the Chernozem area. Only the foodstuffs industry was firmly established there and grew because its most important branches (sugar and alcohol), being in the hands of landowners, were stimulated by Tsarist government measures. As a result of the survivals of serfdom that lasted until the Bolshevik Revolution (the prevalence of landlordism, small peasant holdings, pre-capitalistic forms of land tenure, etc.), the Chernozem Center had all the aspects of a region of "agrarian overpopulation." The region served as an area of recruitment for millions of migrants seeking wages in the areas of commercial farming and in industry and construction in neighboring areas, and supplied most of the settlers migrating to Siberia. The Bolshevik Revolution destroyed the survivals of serfdom, landlord and capitalist exploitation that had bound the Chernozem Center hand and foot. New opportunities were opened up for the economic development of the region.

The Central Chernozem oblasts during Soviet rule attained progress in their economic, and particularly their industrial, development. However, bureaucratic planning of the distribution of industry has left its mark on the industry of the region. For example, in the largest cities of the Central Chernozem oblasts, conveniently situated with respect to transportation (at railroad junctions), various ministries and departments have established machine-building plants operating entirely on outside raw materials and delivering their products to almost all regions of the Soviet Union. It is characteristic that in many cases the Central Chernozem oblasts themselves consume only a modest share of their own products. Such enterprises and their production links usually reach beyond the bounds of the territorial-production complex of the Central Chernozem oblasts. Subcontracting by these enterprises (even for castings, basic supplies, tools, etc.) has generally not been organized within the Chernozem Center, but within the given ministry's own supply system, further adding to the excessively distant irrational production links and weakening the ties between the oblasts within the region. As a result, the conviction arose among economists, including the planning organs, that the Central Chernozem oblasts had no inherent economic unity and could not be the object of planning based on a unified hypothesis, on common prospects for their development and on the task of creating a rational territorial-production complex, insuring the highest productivity of social labor.

If we consider the existing enterprises, certainly not many common features can be found in the economy of the oblasts, especially in their industrial specialization.

Thus, Orel Oblast has specialized in the production of textile machines for the flax and hemp industries, equipment for leather and glass factories, road graders, small hydraulic turbines and pumps, watches, spare parts for S-80 tractors (incidentally, no tractors of this type are turned out by the tractor plants of the central regions), air-conditioning equipment, and so forth. In addition to machine building, hemp processing, alcohol distilling, flour milling and other branches of the food industry have developed in the oblast. Building-materials production is inadequate for the needs of the oblast. Agriculture has specialized in the production of grain, hemp and potatoes. Combined beef-dairy cattle predominate in animal husbandry.

In Kursk Oblast, the machine building is much less important than in Orel Oblast. The electrical industry (batteries and electrical goods) predominate. The output of beet-growing machinery and equipment for the sugar industry has developed to a lesser extent, although these industries still retain their importance in the oblast's economy. Production of rubber goods occupies a prominent place. The raw material for it is received from the outside. In spite of the abundance of raw materials for making building materials, Kursk Oblast suffers just as acute a shortage of them as does Orel Oblast (especially in cement).

Still more one-sided is the production complex of Belgorod Oblast, in which the food industry (especially sugar) and building-materials (cement) industry play the principal role. Machine building is represented by a small group of enterprises of medium capacity, turning out steam-power units and drilling equipment for the mining industry. The processing of the KMA iron ore, except for the small Gubkin quartzite mine, is still in the preparatory stage. The only organic-synthesis chemical enterprise (in Shebekino), turning out fatty acids and alcohols, is not connected with the rest of the production complex of the oblast. Not only paraffin from the Caucasus, but the spermaceti of sperm whales caught by the Slava whaling fleet in the Antarctic serve as raw materials for the Shebekino plant.

Lipetsk Oblast has production of cast iron and pipes, caterpillar tractors (using steel brought from the outside), some articles of the electrical (for example, carbon points for arc lights) and chemical (silico-organic varnishes) industries, cement and so forth. The only industry that has been clearly linked with other branches of the oblast's economy is the iron casting complex, which in recent years has exhausted its local raw-material base and now relies on ore shipped in from Krivoy Rog.

Tambov Oblast is characterized by a fairly varied industrial complex, more connected with the requirements of the Chernozem Center than is the case with the other oblasts. Its machine industry turns out equipment for sugar and alcohol plants and auto and tractor spare parts. The chemical industry furnished rubber and asbestos articles (linings for tractor and automobile engines) and aniline dyes (also needed for local textile factories). The food industry (sugar, alcohol, canned fruit, tobacco) operates entirely on local farm materials and also plays a prominent role.

The production complex of Voronezh Oblast responds best to the tasks of development of the Central Chernozem oblasts. The oblast has a diversified machine-building industry, producing ore-concentrating equipment, excavators (including mine equipment), forge and press equipment, machine tools, grain-cleaning machines, small electric motors, radio and television sets, and machines and equipment for the food industry and the production of building materials. An especially important role is played by the chemical industry, making synthetic rubber and automobile tires (for the time being still mainly from ethyl alcohol derived from edible farm products). The highly developed food industry is also based on local raw materials (grain, sunflower seeds, sugar beets). Voronezh Oblast is also better provided with building materials than the other oblasts. The enterprises of this segment of industry make refractory materials (including those for the steel industry), cement, alabaster and facing tile.

In a somewhat different situation is Penza Oblast, which is also usually included in the Central Chernozem oblasts. Industrially, it is second only to Voronezh Oblast. It has plants making instruments and Diesels, compressors, chemical equipment and textile machines; among the old industries are textiles. However, the connection between Penza Oblast and the Chernozem Center is very weak. On the other hand, Penza is closely connected with the Volga, furnishing equipment for Volga shipbuilding and for the extraction and refining of petroleum. Penza Oblast is therefore more rightly regarded as a transition area between the Chernozem Center and the Volga, and the prospects for its development are more properly treated as a part of the territorial-production complex of the Volga oblasts.

Even the briefest schematic characterization of the economy of the Central Chernozem oblasts indicates that none of them, with perhaps the exception of Voronezh Oblast, has a fully constituted territorial-production complex or is in a position to create one, owing to the small size of the territory and the limited character of local power and raw-material resources.

But if we regard the oblasts of the Chernozem Center as a single whole and plan their prospective development on the basis of a single power supply and the common utilization of the available raw-material, labor and other resources, then it is quite possible to establish a territorial-production complex in which industries that are of national importance will be closely connected with industries serving as their suppliers and those serving local consumers.

The Chernozem Center has no fuel or water-power resources that could insure a large power supply. The power shortage is one of the reasons that its industrial development has been slower than that of neighboring regions. This shortage has also caused the concentration of the major industrial plants in oblast capitals, where electric stations have been built; these operate on coal brought from the Donets Basin and have relatively small capacities. Only the electric stations of Voronezh and Lipetsk have been combined into a power grid. The production efficiency gained by the establishment of a grid has been confined to the two cities. The current expansion of the power plants, which is not associated with an expansion of the grid, will require an increase in the amount of Donets fuel and a corresponding rise in transportation costs because natural gas is not expected to replace coal in the power plants of the Central Chernozem oblasts in the near future. The natural gas delivered from the Ukraine and the North Caucasus will be used mainly as technological fuel and raw material for the chemical industry.

The problem of electrification of the economy of the Chernozem Center can and should be solved not only by joining it with the Cherepet' thermal power station and the Stalingrad-Moscow high-voltage line, but also by building an atomic electric station. Since the opening of new mines the output of coal in the Donbas has increased sharply. This basin, which long ago was not supplying enough steam coal to its consumers, now has a surplus of anthracite fines, for the use of which the construction of several large thermal electric stations has been projected and begun. The further expansion of the power supply of the Central Chernozem oblasts (especially Belgorod and Kursk oblasts and southern part of Voronezh Oblast) should be solved by building new electric stations and transmission lines to link the principal industrial centers with the Donbas electric stations and with each other. The problem of assuring a power supply for the Chernozem Center will then be solved most economically.

The most important problem for the Central Chernozem oblasts will continue to be the rational utilization of local raw-material resources. The lack of mineral fuel is more than offset by the presence of rich iron ore and non-metallics (chiefly for the production of building materials). The confirmed reserves of Kursk Magnetic Anomaly (KMA) iron ore are now fixed at 50 billion tons. Of this amount,about a third is rich ore (15 billion tons). Most of the explored ore sites are in Belgorod Oblast (Belgorod and Staryy Oskol iron-ore districts). The share of Kursk Oblast, where only the Mikhaylovka (Zheleznogorsk) deposit has thus far been explored in detail, is more than 500 million tons of rich ore and 9 billion tons of iron quartzites. On the basis of the Mikhaylovka and Lebedi (near Staryy Oskol) deposits, surface mines for the rich iron ore are being built. They are to yield their first ore in 1960. By the end of the seven-year plan the ore mined from this group may exceed 20 million tons a year. In the thoroughly explored Yakovlevo and Gostishchevo deposits (near Belgorod) the rich iron ore lies at a depth of over 500 m. They are covered by thick water-bearing strata. The great depth of the ore strata and the unfavorable hydrogeologic conditions require the building of large mechanized underground mines with a capacity of 20 million tons of ore or more a year. Only such a large output of ore, which contains over 60 per cent iron and apparently requires no concentration, can justify the great outlay required for building mines under such conditions.

The Chernozem Center oblasts may thus in the near future supply tens of millions of tons of high-grade iron ore a year.

The demand for KMA ore will come primarily from the Lipetsk and Tula plants, which will have an integrated production cycle. These plants have long ago exhausted their local ore supplies and have been obliged to use ore shipped from Krivoy Rog.

The steel plants of the Donbas will also be consumers of Belgorod-Kursk ore, which is just as far away as Krivoy Rog ore. These ore links with the Donbas are also justified by the necessity of making rational use of railroad transportation by loading iron ore on returning cars that have delivered Donets coal to the steel plants of Lipetsk and Tula. Among the consumers of KMA iron ore may also be the people's democracies (Poland, East Germany), whose steel plants are supplied largely with Krivoy Rog ore.

The conversion of the Chernozem Center into one of the most important iron-ore regions in the USSR naturally raises the question of further development of its steel industry. The latter is thus far represented by two steel plants in Lipetsk. One of them (the Svobodnyy Sokol Plant) specializes in the production of cast iron and iron pipes. The other (Novolipetskiy) is being converted to an integrated cycle, including open-hearth and transformer steel, electric steel and cold-rolled sheet.The development of Lipetsk metallurgy (reconstruction of operating blast furnaces and of new ones) will initially absorb all the iron ore mined in the KMA district. The primary efforts of the Central Chernozem oblasts should therefore be directed toward the rapid completion of the reconstruction of the Lipetsk steel industry.

The question of the further expansion of the iron and steel industry, i.e., the construction of new plants, must be studied even now. A proposal for such construction is being advanced by the Kursk and Belgorod regional economic councils, each of which is trying to show that the building of a steel plant (necessarily a large integrated plant) is most profitable only in the territory under its jurisdiction.

According to the Kursk variant, the steel plant should be located near L'gov at the juncture of the flows of Mikhaylovka ore and Donets coal. It remains unclear how this large plant would be provided with flux materials and whether it would not leave without water the cities (Kursk, L'gov, Ryl'sk) lying on the Seym River.

According to the Belgorod variant, the steel plant would be built near

Novyy Oskol on the Moscow-Donbas rail line. By comparison with the Kursk variant, its advantage consists in its being nearer to the coal mines, in the immediate possibility of effecting a shuttle transportation system (loading the coal cars going to the Donbas with Staryy Oskol ore) and in the availability of ore and limestone near the plant itself (absent in the Kursk variant). However, the Belgorod solution is poorly thought out with regard to the plant's water supply. It is proposed to bring water from the Don up its tributary, the Tikhaya Sosna, whose source is near Novyy Oskol. But this entirely disregards the water requirements of the big industrial plants of Voronezh Oblast.

It will be seen from the foregoing that the location of steel plants based on KMA ore is a complex question requiring careful study. Any plans along this line must also solve the question of discharging into the Oskol, Northern Donets and Seym river systems the ground water interfering with the mining of iron ore and the question of the possible use of such water in the proposed steel plants. Proposals of this sort, not yet supported by any calculations, have already appeared in the press.

Also connected with the iron and steel industries in the Chernozem Center are the prospects of further developing machine manufacturing. The type of machinery being produced should be connected more closely than at present with the general development of the economy of the Central Chernozem oblasts. There is such a connection between the machine-building plants that turn out drills (Shchigry), rock excavators, equipment for ore concentrators (Voronezh) and for steel plants (Usman'), electric and radio equipment (Voronezh, Kursk, and others), road and construction machines (Voronezh, Orel), forge and press equipment, and so forth.

Farm machine manufacture, which the Chernozem Center would appear to need more than any other kind, is poorly developed. This branch of machine building makes virtually nothing but grain-cleaning machinery. Because of the rapid growth of sugar-beet production, which requires large labor inputs, the need for beet-growing machinery is especially great.

The type of tractors being produced (KDP-35) likewise does not answer the needs of the agriculture of the Central regions. The Lipetsk Tractor Plant should be converted as soon as possible to the production of wheel-type and narrow track-laying tractors (for planting and harvesting industrial crops) as well as the production of all-purpose tractors, having universal application. The problem of providing agriculture with tractor spare parts in the Chernozem Center has been generally solved. The next objective is to supply agriculture with the new types of tractors planned under the seven-year plan.

The machine-building industry of the Central Chernozem oblasts must also equip the organic-synthesis industry of the region by producing equipment for making synthetic fiber and other chemicals.

Synthetic rubber production at Voronezh has developed on the basis of edible raw materials and has served as the basis for the vulcanized-rubber industry. Under the seven-year plan, after the completion of the second and third North Caucasus-Moscow gas pipelines and the Shebelinka-Bryansk gas pipeline, the region will receive the non-edible raw materials it needs. The production of synthetic rubber (Voronezh) and detergents (Shebekino) will be transferred to the use of natural gas. A new line of production will be that of synthetic fibers, which also fits well into the economic complex of the region, because it will replace cotton cord in the making of automobile tires.

The prospective development of the chemical industry will enhance its role in the production complex of the region. Taken by itself, it cannot change the industrial structure of the Central Chernozem oblasts. The chemical development reflects the present practice of bringing petroleum refining closer to areas of consumption and the consumption density is fairly high here.

The large amount of capital construction intended in the Central Chernozem oblasts under the seven-year plan can be insured only if there is a well-developed building-materials industry here with rational geographic distribution.

The building-materials industry, in spite of its entirely adequate and well distributed supply of raw materials, is poorly developed and does not provide for the region's requirements. Factories in this industry are distributed unevenly in the Chernozem Center. For example, the only cement plants are in Belgorod and Podgornoye (Voronezh Oblast). They send a large part of their output to other regions. While the Podgornoye plant is a medium-capacity plant, the Belgorod plant has become a large plant (five rotary kilns), which it is proposed to expand still more (to seven kilns). This will cause new transportation outlays for the rapidly growing cement needs. The construction of cement plants with one or two furnaces in each of the Central Chernozem oblasts (with somewhat larger capital investments per ton of finished product than in the case of new units at the operating plants) would pay for itself in a short time because it would reduce hauls. It would also satisfy consumers more evenly, especially farms (because of the long hauls, cement costs at the collective farms are twice the f.o.b. price.) Equipment for the new cement plants can be furnished by the Pervomayskiy Machine Plant (Tambov Oblast), which has the necessary capacities for this.

Closely connected with the cement problem is that of production and use in construction of prefabricated reinforced concrete blocks, in which the Chernozem Center is far behind the other regions of the country.

The agriculture of the Chernozem Center specializes in the production of grain, sunflower seeds, sugar-beets, hemp and other industrial crops, dairy and beef cattle and hog raising. This specialization has fully vindicated itself. However, considerable differences have been observed until lately in the trend of the economy of certain oblasts. The planting of sugar-beets, for instance, was relatively limited in Orel, Lipetsk and Tambov oblasts, and sunflower seeds also were not of great importance there. Both crops are prominent in Voronezh and Belgorod oblasts; but in Kursk Oblast, sugar-beets were almost the only industrial crop(except for hemp in the northwest). There were no substantial differences among the oblasts in animal-husbandry specialization.

In recent years differences in agricultural specialization of the individual oblasts have evened out because of the rapid growth of the area planted in sugar-beets, which are becoming the chief industrial crop. Sugar-beet expansion has been accompanied by the construction of new sugar mills. The largest number are being built in Orel, Lipetsk and Tambov oblasts, three or four new mills per oblast. This expansion has resulted in a reduction in the area of other industrial crops while the grain area has been maintained. This tendency is expected to continue in the future because sugar beets appeal to collective farms as the most profitable industrial crop under Chernozem Center conditions.

The Central Chernozem oblasts are rapidly becoming a major sugar-beet growing region, which, together with the Ukrainian SSR, will supply the bulk of the nation's sugar.

Rapid fulfillment of this agricultural objective is undoubtedly of great importance. However, it cannot be considered rational that the sugar-beet area in Voronezh Oblast should increase at the expense of sunflowers, or at the expense of sunflower and coriander seeds in Belgorod Oblast. In Lipetsk Oblast the area of makhorka (low-grade tobacco) is being reduced even in the traditionally makhorka-growing Usman' rayon.

The seven-year plan 1959-1965 provides for a considerable increase in the yield of oil crops in the Central Chernozem region of the RSFSR in view of an expected rise in demand for vegetable oils. Areas where oilseed cultivation has fully proved itself (in Voronezh, Belgorod and other oblasts) should therefore be maintained.

The Central Chernozem oblasts will continue to rank among the grain-producing regions. However, since Siberia, Kazakhstan, the Volga and other eastern regions have begun to play a leading role in supplying commercial grain, the Central Chernozem oblasts have moved to a secondary place in that respect. Deliveries of industrial crops have become dominant. The growth in sugar-beet production should therefore be to some extent at the expense of the grain area. This reduction would not be reflected in total grain deliveries because the grain harvest is expected to increase through an expansion of higher-yielding corn plantings.

The achievement of greater homogeneity in agricultural production is helping to weld the Central Chernozem oblasts into a single economic region. This in turn confronts the planning organs with the task of working out the region's long-term economic development as a single unit. Only under these conditions can a higher level of labor productivity be insured.

The present administrative structure of the Chernozem Center clearly does not correspond to a rational territorial organization of the economy and to a more economical solution of the general economic problems. The structure has become too fragmented. It is quite evident that the problem of exploiting the Kursk Magnetic Anomaly and developing a steel industry must be solved as a whole, not divided between the economically weak oblasts of Kursk and Belgorod. There is hardly any purpose in the existence of such oblasts, whose appearance was not economically justified.

Inseparable from these questions is that of improved distribution of industrial production, especially the new industrial construction projects. Except for the food industry and building materials, which are directly connected with sources of raw materials and are therefore situated in rural localities, most of the factories built in the Chernozem Center under Soviet rule are in the oblast capitals. The small towns, which lost their former administrative and commercial importance after the revolution, remain poorly developed industrially although their transport location and good labor supply in many cases make it advantageous to locate new industrial enterprises there. For this reason, the possibility should be studied of locating in the small towns factories whose construction is contemplated in the seven-year plan. This would free the oblast centers of the threat of oversaturation with industry, which has already become a very real one (for example, in Voronezh).

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CHANGES IN THE GEOGRAPHY OF MACHINE BUILDING IN THE USSR

By A. G. Omarovskiy

(From Izvestiya Akademii Nauk SSSR, Seriya geograficheskaya, 1959, No. 2, Pages 38 - 49).

Machine building is the foundation of technical progress and development of the whole national economy. It provides machines and equipment for all branches of production and also furnishes durable consumer goods such as automobiles, bicycles, sewing and washing machines, television sets, radio receivers and so forth.

From a backward industrial sector manufacturing only small amounts of machine tools and locomotives, horse-drawn plows and planting machines, steamships and steam-traction engines and other simple machines, machine building has been converted during Soviet rule into one of the most advanced branches of the national economy capable of producing complicated machines and equipment. The world's first atomic electric station has been operating in the Soviet Union since 1954. Construction began in 1958 on the first 100,000-kw. unit of the world's largest atomic electric station, with a total capacity of 600,000 kw.; and the construction of the atomic icebreaker Lenin is being completed. The most powerful synchrophasotron in the world has been built. The production of intercontinental ballistic missiles and modern jet planes has been instituted. Artificial earth satellites and a cosmic rocket have been manufactured and shot into space. A number of electronic computers have been made. Many other machines and instruments are being manufactured.

The total production of the machine-building and metal-fabricating industries now exceeds the 1913 level by more than 240 times. These industries employ about one-third of the industrial workers and account for about one-fourth of the industrial fixed capital of the USSR.

During Soviet rule the production of many kinds of machines and equipment has been created anew on a large scale. Thus, in 1913, turbines with a total capacity of 6,000 kw. were turned out, whereas in 1958 the total capacity was about 7 million kw. In 1913, 1,500 metal-cutting machine tools were produced; in 1958, about 140,000. The industry of the USSR is now producing annually 220,000 tractors, 10,000 excavators and 500,000 motor vehicles.

The control figures on the development of the national economy of the USSR state:

"The coming seven-year period will be marked by technical progress in all branches of the national economy. This is insured above all by the development of the national machine-building industry, especially machine tools, instruments, electronics, electric technology, and the production of new and improved kinds of equipment for the metallurgical, chemical, oil and gas industries; and by the development of the production of polymer materials and the further expansion of the sphere of application of atomic energy for peaceful purposes" (Materialy vneocherednogo XXI s"yezda KPSS (Proceedings of the Extraordinary 21st Congress of the Communist Party of the Soviet Union), 1958, p. 184).

It is intended to double the output of the machine-building and metal-fabricating industry during the seven-year period. There will be a high rate of growth in the production of turbines (2.8 to 3.1 times), generators (3.4 to 3.5 times), chemical equipment (3.2 to 3.4 times), electric and Diesel locomotives (2.9 to 3.1 times), and instruments (2.5 to 2.6 times). Along with the steady growth of production there will be a more rational distribution of the machine-building enterprises over the territory of the country.

In pre-revolutionary Russia almost all machinery was produced in the regions of the Center, in Petrograd and in the Ukraine. On the vast territory of the Urals and the Volga, Kazakhstan and Central Asia, Siberia and the Far East, less than one-tenth of the whole machine-building and metal-fabricating output was produced.

During the pre-war five-year plans there was considerable development of machine-building plants in the old industrial regions -- the Center, Leningrad and the Ukraine -- which became support bases for the technical retooling of the national economy.

The Central region became a site of a large automobile industry, represented by the Moscow, Gor'kiy and Yaroslavl plants and also by a large number of enterprises supplying semi-manufactured goods and materials to the automobile plants. An important sector in this region is machine-tool building, with the Moscow plants Krasnyy Proletariy, Ordzhonikidze, the grinding tool plant, the casting equipment plant, and a number of plants in other cities.

The tool-making industry is widely developed in this region. It is represented by the Frezer and Kalibr plants and by large tool-making departments of the machine-building plants.

A complex of enterprises of the power machinery and electrical industries has been created in the Central region. In Moscow, Penza and other cities are a number of plants producing instruments, watches, calculating machines and so forth. The region also produces machines and equipment for the light and food industries, construction and agriculture as well as refrigerators, vacuum cleaners, sewing machines and other appliances. Production of textile machines has been organized in Moscow, Ivanovo and Klimovsk; sewing machines in Podol'sk and Tula; farm machinery in Lyubertsy, Tula, Ryazan', Penza and Bezhetsk.

The Central economic region contains large machine-building centers represented by groups of enterprises: Moscow and its environs account for a wide range of diversified machine building. It is difficult to name a branch of machine building and metal fabrication that has not been created in Moscow. Gor'kiy Oblast has automobile and machine-tool building, and Penza Oblast the manufacture of instruments and calculating machines, chemical and farm-machinery production.

A large complex of machine-building plants has been created in Leningrad and its suburbs. It comprises machine tools, turbines, electrical equipment, instruments, shipbuilding and production of machines for the fuel, metallurgical and chemical industries.

The production of power-generating equipment, in which Leningrad occupies the leading place in the USSR, has been organized at the Stalin machine plant, which manufactures turbines, and at the Kirov plant, which manufactures generators. Cooperating with one another, these plants produce equipment for thermal and hydraulic electric stations. Turbines and generators with a capacity of 100,000 to 150,000 kw. are manufactured, and the production of even larger units is being planned.

Leningrad plays a key role in the production of precision machines, equipment and tools. Its enterprises manufacture control and measurement instruments of a high degree of precision, calculating machines, heat-control and electrical measurement devices, electron microscopes, and television receiving and transmitting equipment.

The Center produces about 2 million tons of pig iron and more than 2.5 million tons of steel. In the North, a steel-supply base is being created at the Cherepovets steel plant.

A large machine-building complex has been created in the Ukraine. It includes machine-building industries consuming large amounts of steel, such as metallurgical, mining and chemical equipment, Diesel locomotives, railroad cars and tank cars, tractors and agricultural machinery, metal-cutting machine tools, and building and road machines. Also widely developed in this region are the electrical, instrument-making and other branches of machine building.

Favorable conditions for the development of these industries in the Ukraine are the presence of a large coal and steel base and the proximity of a market for finished products.

Along with the development of machine building in old industrial centers, large plants and whole groups of machine-building enterprises have been created in new regions: in the Urals and the Volga, in Siberia, in the Far East, and in Central Asia.

The Urals have become one of the biggest machine-building regions in the country, occupying third place after the Central and Ukrainian regions. It contains dozens of large machine-building plants, manufacturing machinery and equipment for industry, agriculture, transportation and construction. The Uralmash heavy machine-building plant, largest in the country, manufactures machinery and equipment for the metallurgical, petroleum-extracting, chemical, coal and mining industries. In the twenty-five years of its existence, the plant has delivered machinery and equipment for blast and open-hearth furnaces, rolling mills, excavators, crushing and grinding machines and drills. About 75 per cent of the pig iron produced in the USSR is smelted in blast furnaces equipped by the Uralmash. Rolling equipment bearing its trademark UZTM can turn out about 12 million tons of rolled shapes and sheets a year, which is more than a fourth of the rolled steel produced in the country. As much as 80 per cent of all ferrous and nonferrous ores is processed in crushers, grinders and sinter belts manufactured at this plant.

The Urals contain the Chelyabinsk tractor plant, largest in the country, turning out heavy crawler tractors; the Tagil and Ust'-Katavskiy railroad car plants, the Miass automobile plant, plants for coal, chemical and power-machine building, and for electrical tool and machine-tool industries.

Ural machine making has developed at a high rate in the post-war years. In 1955, 6.4 times as much machinery and equipment was produced in the Urals as in 1940.

A new large center of machine manufacture has been established during the Soviet years in the Volga region. To satisfy the needs of the developing oil and gas industry in the Volga, plants have been built to produce drilling bits, electric motors and pressure gauges. The region contains a modern machine-tool manufacturing industry. Several plants have been built to serve agriculture: the Stalingrad tractor plant, the Syzran' combine plant, the Kuybyshev electric milking machine and separator plant and many enterprises for the production of spare parts and repair of farm machinery. To serve river transportation, large shipyards and plants for the production of dredges and ship engines have been built. An automobile plant, several ball-bearing and auto-tractor parts plants have been built in this region.

The need for mechanization of loading and unloading in the ports and at transfer junctions has resulted in the creation of enterprises for the production of hoisting and crane equipment. Equipment for the light and food industries is produced at Saratov, Kuybyshev and other cities. Watches, typewriters, instruments and metal articles are also turned out in the Volga region. The machine-building and metal-fabricating industry of the Volga has been developing at a rapid rate during World War II and the post-war period; in 1955 the production of these industries was almost twelve times greater than in 1940.

A machine-making industry has been established in Western Siberia. Some enterprises were built here during the pre-war five-year plans, but most large plants were built in the last ten to fifteen years. In 1955, machine and metal-fabricating production in this region grew almost twenty times over 1940. Plants for the manufacture of tractors and farm machinery, machine tools, power, electrical, transportation and coal machinery, instruments and precision machines were built.

Large machine-manufacturing centers arose in Kemorovo Oblast and Altay Kray, and in Novosibirsk, Omsk and Tomsk oblasts. Kemorovo Oblast is economically the most developed part of Western Siberia, with enterprises of the coal industry, ferrous and nonferrous metallurgy, chemical industry and machine building. The growth of the steel industry and other branches of heavy industry has led to the establishment of enterprises for the manufacture of machinery and equipment for many branches of the national economy. Kemerovo Oblast produces machinery and equipment for the coal industry, grain-milling and elevator equipment, and building equipment.

Machine building is the leading branch of industry in Altay Kray. On the basis of the development of machine building, the old city of Barnaul has become a modern industrial center, and new cities have sprung up: Rubtsovsk, Biysk and Slavgorod.

The city of Novosibirsk is a characteristic example of the formation of modern machine-building centers. In pre-revolutionary times it was the small commercial town of Novonikolayevsk with seven flour mills and some small enterprises for the processing of agricultural raw materials. The total production of the town's industry in pre-revolutionary times was a few million rubles, only 2 per cent of which was metal fabrication, in the form of railroad shops. The turning point in the economic development of Novosibirsk came in the pre-war five-year period when large machine-building plants were established and large enterprises of the leather and footwear, sewing, food and woodworking industries were built. Novosibirsk's industry grew especially during World War II and the post-war period. In 1957 several times as much industrial production was turned out as in 1940. The structure of industry changed considerably: the role of machine building grew, metallurgy appeared and the significance of the chemical industry was enhanced. Present-day Novosibirsk is a city of machine builders, producing farm machines, electric generators and motors, Diesel electric equipment, electric saws, coal-mining equipment and electric lamps, structural steel for bridges and the mining industry, pumps, drilling equipment, river vessels, telephones, bearings and various instruments. Tool-making and machine-tool plants turn out forge and press machine tools, and measuring, cutting and mechanical tools.

Omsk is a big machine-building center, producing electrical goods, motors and machine tools, foundry equipment and farm machinery, equipment for transportation and for the leather, wool and meat-and-dairy industries, precision tools and spare parts for tractors. Enterprises of the machine-building industry have also been established in many other cities of Western Siberia.

A very large complex of machine-making plants is being established in Western Siberia, relying on its own steel and power base and furnishing machinery and equipment to industry, agriculture and transportation of the eastern regions of the country.

Groups of enterprises of the machine-building industry have been established or are being established in other regions. The Azerbaydzhan SSR, for example, has several enterprises manufacturing equipment for the petroleum industry. The Uzbek SSR has plants making cotton-growing machines. The Far East has shipyards, and Eastern Siberia has plants producing equipment for the mining and lumber industries.

As a result of the building of a large number of machine-building enterprises in new regions, the production of machinery and equipment there is growing considerably faster than on the average for the USSR (See table on Page 48).

The table shows that the total production of the machine-building and metal-fabricating industries expanded from 1940 to 1955 by 4.7 times in the country as a whole, whereas it grew almost 20 times in Western Siberia, 12 times in the Volga, more than 12 times in the Uzbek SSR, 6.4 times in the Urals, 8.5 times in the Belorussian SSR, and 18.8 times in the Armenian SSR. Somewhat lower than the national average was the development of machine building and metal fabrication in the regions of the Center and Western Siberia, the Ukrainian SSR and in the North Caucasus. The higher rate of growth of machine production in Western Siberia, the Volga and the Urals testifies to the considerable shift of machine building to these regions. The eastern regions now produce about one-third of all Soviet machinery. It should be noted that all industry in these regions has also been developing considerably faster than the national average.

The concern of the party and government about speeding up the development and uniform distribution of the machine-building industry in many regions of the country has resulted in the creation of large complexes of manufacturing with a wide range of enterprises turning out various kinds of machinery and equipment; this has led to a more rational distribution of the machine-building industry over the regions of the country.

Bringing the machine-building enterprises closer to the sources of raw material reduces transportation costs. Bringing them closer to the market makes it possible to adapt machine design better to operating conditions.

Rate of growth of the production of all industry and of machine building and metal fabrication in the USSR (1940 = 100) (*)

	1950		1955	
	All industry	Machine building and metal fabrication	All industry	Machine building and metal fabrication
USSR	173	215	320	466
RSFSR	175	221	314	472
Northwest	128	149	244	311
Center	155	180	281	413
Volga	263	509	523	1163
North Caucasus	116	158	213	351
Urals	292	350	515	640
Western Siberia	314	903	563	1993
Eastern Siberia	198	237	338	458
Far East	163	265	254	438
Ukrainian SSR	115	144	220	331
Belorussian SSR	115	237	237	851
Uzbek SSR	183	653	294	1240
Georgian SSR	156	299	265	555
Azerbaydzhan SSR	139	316	202	444
Armenian SSR	249	720	476	1876

(*) See Promyshlennost SSR (Industry of the USSR), Gosstatizdat, 1957

The creation of machine-building enterprises in formerly backward and remote regions of the country insures the raising of production technology and of the general cultural level of the population.

Soviet machine building is distributed over almost all the economic administrative regions. However, certain branches of machine building have not yet been sufficiently developed in the new regions. For example, about 80 per cent of all motor vehicles are manufactured in the Central region, although automotive factories have lately been built in the Urals, the Volga, Belorussia, Georgia and the Ukraine. In the future, automotive plants will also be associated with the third metallurgical base in the eastern regions.

The production of excavators is concentrated mainly in the Center. Almost all the mainline Diesel locomotives and electric locomotives are manufactured in the southern and central regions of the country. Yet a great deal of construction is now under way in the eastern regions, and railroads are being converted to Diesel and electric traction. The control figures on the development of the national economy of the USSR point out that the trunklines Moscow-Kuybyshev-Irkutsk-Far East, Moscow-Gor'kiy-Sverdlovsk and Karaganda-Magnitogorsk-Ufa will be electrified in the next seven years. Electric locomotives for these railroads could be manufactured in the eastern regions of the country.

During Soviet rule a more uniform distribution of the machine-tool industry has been effected. Before the revolution, about 80 per cent of the machine tools were manufactured in the Center and Northwest, but now only about 30 per cent are manufactured in the Center, and 4.4 per cent in the Northwest. At the same time a considerable quantity of machine tools are turned out in regions that formerly had no machine-tool plants: 12 per cent in the Ukraine, about 10 per cent in Belorussia, more than 10 per cent in the Urals, about 9 per cent in the North Caucasus, and more than 7 per cent in the Volga region.

The production of tractors and farm machinery, electric motors and electric equipment, construction, road and other machinery and equipment has been organized in many regions.

The control figures on the development of the national economy point out that the main shifts in the distribution of the productive forces in the coming seven-year period are intended mainly to speed up the economic development of the eastern regions. Forty per cent of all capital investments will be applied in 1959-65 to the development of the eastern regions, including the Urals, Siberia, the Far East, Kazakhstan and Central Asia. As a result of the planned development the share of the eastern regions in the national total in 1965 will reach 48 to 49 per cent for crude and rolled steel, about 50 per cent for coal, 46 per cent for electric power, over 45 per cent for sawnwood and 30 per cent for petroleum extraction.

The capital investments are directed primarily at the construction of new enterprises for the extraction of petroleum, gas, electric power production and expansion of raw-material production. As for the manufacturing industry, the seven-year plan calls for the reconstruction, expansion and technical retooling of the operating enterprises on the basis of integrated mechanization and automation and new technological processes contemplating a broad renovation and modernization of equipment.

This provision also relates to the machine-building enterprises, in which a considerable growth in capacities can be obtained through the reconstruction, expansion and modernization of equipment. This is especially important for creating an integrally developed economy in the major economic regions.

In addition, new enterprises of the manufacturing industry will also be built in a number of cases, including machine plants. The control figures on the development of the national economy for 1959-65 provide for the construction of rolling and mining equipment plants and other machine-building enterprises in the Kazakh SSR, machine and instrument plants in the Armenian SSR, and others. New construction of machine-building enterprises will extend beyond the current seven-year period. However, schemes for the development and distribution of various industries and economic regions should even now be worked out so as to effect the most efficient distribution of enterprises.

The building of large thermal and hydraulic electric stations in Siberia and other eastern regions will require the creation of enterprises for the production of power and electrical equipment. The development of ferrous and nonferrous metallurgy and the coal and chemical industries creates conditions for the construction of heavy machine-building plants. The large scale of construction to be done over a large territory will require a considerable amount of construction and road machines, the production of which can best be organized in these regions. These sectors of the machine-building industry require a large amount of steel, and the machines and equipment turned out by them are bulky and inconvenient to transport. They are therefore best located near steel suppliers and near markets.

The establishement of a complex of heavy machine-building enterprises in the eastern regions insures the rational organization of heavy machinery and equipment production on the basis of broad specialization and subcontracting. Specialized bases for the production of forgings and stampings, cast-iron and steel castings, reinforcements, standardized joints and sub-assemblies, and plants for the repair of equipment, production of tools and attachments can be created for all the enterprises of this complex.

In the distant future, when considerable quantities of steel, plastics and other materials will be produced in the eastern regions, the construction of a complex of enterprises of the automotive industry, consisting of several factories with designing and experimental bases, a number of auto-assembly plants and a large number of specialized enterprises for the manufacture of sub-assemblies, joints and parts, and forgings, castings and stampings will prove entirely advisable.

The establishment in the East of heavy machine-building and automotive industries and the building of enterprises for the manufacture of machinery and equipment for other branches of industry and agriculture will in turn require the production of metal-cutting equipment and tools, and a number of industries serving the machine-building industry.

The general tendency in the distribution of machine building is to bring enterprises closer to the sources of raw materials and to the consumers of finished products, but it cannot be restricted by this general definition because various industries depend to a greater or lesser degree on different factors

In Siberia the tendency should be to produce machinery and equipment that require a great deal of steel and are unwieldy to transport because the steel will be produced and the finished products consumed within a limited area.

Industries requiring more labor and less metal should be organized in Transcaucasia and Central Asia. These regions now produce nonferrous metals and will acquire plants for the production of plastics to be used in the making of instruments and in the radio and electrical industries.

Machine-building enterprises should be located in clusters. Major economic zones should contain almost all machine-building sectors; within these zones groups of plants should be established in individual industrial centers.

The reorganization of the management of industry and construction according to the regional principle and the creation of regional economic councils has had a major effect on the location of machine-building plants.

In the first stage of their activity, the regional councils brought order into inter-industry relations and into the utilization of resources within the economic administrative regions. Now, some regional economic councils are beginning to work on and solve the problems of the integrated development of the economy of the regions, carrying out planned measures for overcoming disproportions, and arranging direct relations between the enterprises both within the economic administrative regions and beyond their borders.

However, much remains to be done in the matter of the integrated development of the economy of the economic regions and the rationalization of inter-industry relations. The most important task of the central planning organs and scientific research organizations is to determine the proper specialization and trend of development of the economy of the economic-geographic regions and to establish the most rational industrial structure of the economy, with consideration for the development and distribution of the country's productive forces.

The regional economic councils are doing a great deal of work in concentrating the production of hardware, electrodes, fittings, castings and forgings in the best equipped specialized departments. This is far more economical than production in small general-purpose departments and shops. But this is only the first step toward further organization of production in specialized plants equipped with modern technology.

Complexes of machine-building plants to be created within the major economic zones should be able to manufacture almost the whole range of machinery and equipment except unique machines used in the given economic zone. At the present level of development of productive forces, five to seven complexes of machine-building plants could be created in the Soviet Union in the next ten to fifteen years. The creation of such complexes in the economic zones will insure the manufacture of certain types of machinery and equipment for the given zone and, in part, for export to other zones.

The control figures on the development of the USSR national economy point out that the differentiation of major economic-geographic regions in planning contributes to the correct geographic distribution and the most economical territorial organization of the national economy of the Soviet Union. For this reason, the control figures for development of the national economy in 1959-65 provide for further specialization and integrated development of the economy of the republics and major economic-geographic regions.

Since the reorganization of the management of industry and construction a large number of coordinating meetings have been held in various regions of the country.

Machine building especially needs coordination of the work of its various sectors and enterprises. For example, a regional meeting of the representatives of the Transcaucasian economic administrative regions, devoted to questions of specialization and subcontracting in machine building, was held in Yerevan. A similar meeting was held in the Western region, at which representatives of Belorussia, Lithuania, Latvia and Estonia discussed the specialization of production of farm-machinery and electrical goods. In Gor'kiy, a meeting was held on the coordination of the work of enterprises delivering raw materials and semi-manufactured goods to the Gor'kiy automobile plant. A similar meeting was held in Minsk on the coordination of the work of enterprises manufacturing tractor parts and sub-assemblies.

At a conference on the development of productive forces of Eastern Siberia there was a machine-building section at which more than twenty papers were read on various branches of machine building.

In addition, nation-wide meetings were held on the development of individual industries: in Kiev, on the manufacture of construction and road machinery; in Minsk, on the manufacture of machine tools; in Sverdlovsk, on heavy machinery;in Voronezh, on forge and press equipment, and so forth. These meetings discussed future problems of the development and distribution of production.

The formation of major complexes of machine-building plants within the economic zones insures a better organization of production of specific types of machinery and equipment, brings the enterprises closer to the regions of consumption, and helps to shorten excessively long and other irrational hauls.

The creation of groups of machine-building enterprises in the industrial centers contributes to a better organization of production and a more rational utilization of modern technology. The work of a number of scientific-research institutes has shown that, for all the variety of machines and equipment, many of them have components and sub-assemblies of similar design, configuration and dimensions and consequently a common technology of production. In the manufacture of compressors, it is quite possible to use parts of automobile and tractor engines such as connecting rods, crankshafts, pistons, cylinder sleeves, etc. To manufacture these parts with the proper standardization it is advisable to organize specialized enterprises serving various branches of machine building. A network of enterprises satisfying the requirements of economic administrative regions for repairs and hardware could be created in these regions as a part of the machine-building complexes serving the larger economic zones and insuring the rational organization of machinery and equipment production.

The integrated development of the economy in the economic regions promotes the rationalization of intra-regional and inter-regional relations. Moreover, the growth of productive forces is organically connected with the intensified specialization of production on a nation-wide scale and with a more thorough geographic division of labor.

In a Socialist economy the specialization of production should be linked with the integrated development of the economy of the economic regions. It should be emphasized that rational specialization does not mean excessively narrow specialization, just as the integrated development of the regions does not mean autarky. In the further specialization and integrated development of the economy of republics and regions, the provincial conception of an integrated economy as a closed economy must be combated. Specialization of production should insure the most effective use of modern technology and the organization of production in individual sectors of the national economy by promoting the development of the economy in the economic regions; it should insure a rational combination in the development of the various branches of production by insuring the fullest utilization of the natural resources, of the historically constituted conditions and the customs of the population, of transportation and other factors.

A distinctive characteristic of the machine-building industry is the distribution of the enterprises in groups (clusters) . This is shown by the experience of the machine-building industry of the Soviet Union and abroad. It is no accident that in such major industrial centers as Moscow, Leningrad, Khar'kov and Gor'kiy groups of machine-building enterprises of a definite type of specialization have been created. The same has happened in the new regions: Novosibirsk, Penza, Omsk, Barnaul, Khabarovsk and others.

The distribution of machine-building plants in the various regions by groups makes it possible to improve the specialization of enterprises, and permit the centralization of production of general machine-building components and supplies, and the creation of large experimental plants, special designing offices and scientific-research institutes.

The control figures contemplate the further development of the procurement base of machine building both through improvement in the specialization and reconstruction of the operating enterprises and through the construction of 75 to 80 new specialized departments and plants for the production of castings, forgings and stampings, a considerable expansion of the specialized capacities for the production of mass-application items -- normal reducers metal-cutting tools, hardware, electrodes, fittings, industrial accessories and other articles -- and the concentration of their production in a smaller number of enterprises

In the solution of the problems of distribution of machine-building enterprises it must be taken into account that in the old industrial centers advantage can be taken of the presence of the transportation network, public utilities and other installations and housing, making it possible to build and put a plant into operation quickly. However, a one-sided consideration of these factors alone may cause an irrational distribution of enterprises and their concentration principally in previously constituted machine-building centers.

In order to make it easier for organizations to select sites for the construction of enterprises, it is necessary to plan the long-term development and distribution of the main branches of the machine-building industry by economic zones for the next fifteen to twenty years. Such schemes could serve as a basis for planning machine-building complexes based on a system of broad specialization and subcontracting in production.

The planning of the long-term development of the main machine-building industries by major economic zones is necessary because modern enterprises represent separate parts of complicated producing complexes operating according to a single plan.

In projecting the construction of new, and the reconstruction of existing, enterprises, it must be taken into account that every such plant adds to the existing specialization or creates a new specialization for the region. The creation of new, and the further development of the existing, plants in Central Asia turning out machinery for cotton processing and for the textile industry, of plants in Georgia turning out equipment for the tea and wine industry and of plants in Belorussia making peat equipment contribute to the development of important industries in these regions and the greater integration of their economy.

The major machine-building plants exercise immense influence upon the whole economy of a given region. For example, the building of a large automotive plant in Gor'kiy caused the formation of many new manufacturing industries and a change in the specialization of a large number of existing enterprises New industries arose for making electrical equipment, generators, magnetos, storage batteries, carburetors, starters, relays, bearings, standard auto parts, springs, hardware, driver's implements, accessories, tires, plastic articles and many other kinds of goods. The specialization of a large number of enterprises of Gor'kiy and its oblast was changed. The Krasnaya Etna plant was reconstructed and specialized in the production of standard auto parts, wire, springs, reinforcements and cold-rolled strip metal. At the glass plant in Bor, the production of auto glass was developed; at the Krupskaya paperboard factory, cardboard linings. At Pavlovo on the Oka a driver's implement plant was built. The felt factory at Tolokontsevo station, the Kalinin leather plant in Bogorodsk and many other enterprises of the Gor'kiy industrial region were converted to the production of parts and articles for the automobile industry. Outside of Gor'kiy Oblast, the Gor'kiy auto plant caused the specialization in Moscow Oblast of thirty-four enterprises producing over eight hundred articles; in Leningrad Oblast, twelve enterprises producing 255 articles. The Yaroslavl rubber and asbestos plant, the Krasnyy Oktyabr' factory in Ivanovo Oblast, the Kineshma factory for the production of fiber linings, the Kuybyshev carburetor plant, and many enterprises in the Ukraine and the Urals have become suppliers of the auto plant.

This example shows clearly that the correct geographic distribution of industry requires a careful and differentiated approach to the individual sectors and kinds of machine building. It is necessary to ascertain with all possible completeness the characteristics of the various kinds of machine building and their influence upon the economy of the regions in which their development is contemplated.

The vast program contemplated by the control figures for the development of the national economy of the USSR in 1959-65 provides for a high rate of development of the machine-building industry to insure the supply of new equipment to enterprises and a radical improvement in the technology of production. This will be a decisive factor in the growth of labor productivity , the easing of the working conditions and the further shortening of the work day

Along with a high rate of growth in the output of machinery and equipment further shifts in the distribution of enterprises are being effected. The tasks envisaged by the control figures insure the further specialization and integrated growth of the economy both of the republics and of the major economic-geographic regions. Machine building will occupy an important place in the integrated development of these regions. For example, a large growth in the production of machinery and equipment is expected in the RSFSR; the Urals will retain the leading place in heavy machine building. In the Kazakh SSR, where the construction of rolling-mill and mine-equipment plants and other machine-building enterprises is contemplated, as well as in other regions, much work must be done in specializing plants and improving the utilization of their production capacities. Further development of machine building is also contemplated in the Belorussian SSR, the Azerbaydzhan SSR, the Latvian SSR, the

the Kirghiz SSR, the Armenian SSR and other republics. This will contribute to further improvement in the distribution of the machine-building industry of the USSR.

Economic Scientific-Research Institute
of the State Planning Committee of the USSR

B. N. Semevskiy, Soyedinennyye Shtaty Ameriki; kratkiy ekonomiko-geograficheskiy ocherk (The United States of America; a short economic geographic survey). Text of lectures given at the Leningrad State Teachers College named for A. I. Gertsen. Leningrad, 1956, 130 pages with maps.
Reviewed by A. K. Arskiy

(From Izvestiya Vsesoyuznogo Geograficheskogo Obshchestva, 1958, No. 3, Pages 294 - 296).

The study of the United States occupies an important place in courses on the economic geography of foreign countries. However, no textbooks on the economic geography of the United States for higher schools have been published for a number of years. For this reason, the work under review will possibly be used not only by students of the geography department of the Gertsen Teachers College, for whom it was published, but also by teachers of other higher educational institutions. It would therefore seem to be of interest to evaluate the general organization of the work and the quality of its economic-geographic data.

Almost no American literature was used in compiling the book. It was written mainly from materials taken from old textbooks, reference works and translations, as well as from newspapers and journals.

The book does not show the present distribution of production in the United States. While the brief historical section is rather well done, the nearer it comes to the present, the more is economic geography replaced by general phrases and general political judgments. It is significant that in the chapter "General characterization of the economy," consisting of seven pages, less than one-third of a page is devoted to problems of the economic structure, which are especially important for a course in economic geography.

Industrial construction during the war years is hardly discussed, and the post-war shifts in the geography of United States industry has been overlooked entirely. The textbook does not reflect the post-war development of the atomic industry (the author speaks only of the wartime nuclear plants of

Oak Ridge and Hanford, but he says nothing about the post-war plants at Paducah, in the Portsmouth area, and on the Savannah River). The book does not note the creation of a petrochemical and aluminum industry in the Southwestern Center (where about 40 per cent of the whole primary aluminum-smelting capacity was concentrated in early 1956), or the development of the aircraft industry in the Northwestern and Southwestern Center, or the steel industry of the Mountain States and the Southwestern Center, or other substantial shifts in the distribution of the manufacturing industry of the United States.

Nor does the book reflect the radical changes in United States energy resources, whose structure is not discussed at all in the lectures. The author confines himself to the assertion that coal plays an especially large part in the energy resources of the United States (p. 47). Actually coal is second to oil, and the share of coal in the energy supply of the United States is considerably less than in the world as a whole. A characteristic of the United States energy supply is also the wide use of natural gas. The share of this fuel in the United States energy supply is growing rapidly: in 1955 it was 25.5 per cent (in the same year the share of coal was 29.5 per cent, oil 41.2 per cent, and hydroelectric power 3.8 per cent (1). But the textbook notes only that the United States holds first place in the world in natural gas reserves and states that "a considerable part of it is released into the air or is burned at the wells to avoid competition for petroleum" (p. 47). There was a time when this was actually so. But for a long time already the United States has not only used almost all the gas recovered with petroleum, but has been producing natural gas on a large scale.

These and some other important questions are left undiscussed in the textbook. At the same time, it abounds in wordy sentences, such as the following: "There has been extensive development of the production of plastics, widely used in military manufactures for handles of pistols, bayonets and machine guns, in the production of shells, in helmet linings, in whistles, bugles, skis, raincoats, gas masks, navigation instruments, in insulated wires and cables, in binoculars, in the manufacture of landing craft and patrol boats, in tableware, and so forth" (p. 56).

The factual data in the textbook are in considerable part entirely obsolete and do not reflect present activities. This can be shown with many examples, but owing to limitations of space we shall analyze only a few data from the transportation chapter. The distribution of freight traffic by types of transportation is represented in this chapter in the following manner: railroads about 70 per cent, inland water transportation 14 per cent, oil pipelines 10 per cent, truck transportation 5 per cent. These percentages are correct (very approximately) for the pre-war period, but in 1953, even without counting coastwise shipping, the share of the railroads amounted to only 52 per cent, truck transportation 17 per cent, inland waterways 17 per cent, and pipelines 14 per cent (2). A map of the United States oil-pipeline network agrees with a map in Khachaturov's book Razmeshcheniye transporta v kapitalisticheskikh stranakh i v SSSR (Distribution of transportation in the capitalist countries and the USSR), published in 1939 (the map was undated); it does not show the many oil pipelines built during World War II and later . The book contains such anachronisms as the Toledo-Cincinnati Canal, which has long ceased to function At the same time, the author omits the Intracoastal Waterway, which in volume of freight traffic is second only to the canals of the Great Lakes, and he also omits any reference to the beginning of work on the St. Lawrence River project (on p. 43 the author emphasizes that the realization of the project is being frustrated by monopolies). Regarding the United States locomotive pool, it is stated that it numbers 42,000 steam locomotives (actually, in 1953 there were only 12,274 and now there are even fewer) and 900 electric locomotives (p. 75); the book does not even mention Diesel locomotives although more than 85 per cent of all railroad freight is now moved by Diesel locomotives in the United States.

The book provides no integrated picture of the geography of United States industry; it contains neither a general characterization of the distribution of all industry nor a characterization of the distribution of its branches. For example, in describing machine building, the author begins at once with disconnected bits of information about the location of specific industries, but does not emphasize the main element, the concentration of machine building in the eastern industrial half of the North, which considerably exceeds the concentration of all manufacturing industry in this region (3). Nor does he note the fact that within the eastern industrial half of the North machine building is especially well developed in the Northeastern Center. The author confines himself to enumerating the areas where certain branches of machine building are concentrated He uses the same method in characterizing other branches of industry.

Furthermore, the choice of industrial centers is rather arbitrary. For example, such small cities as Muncie, Ind., and Richmond, Ind., (each of which has fewer than 20,000 workers in manufacturing) are named three times as very large industrial centers; on p. 55 they are listed among the five cities in which "the largest number of tractors and agricultural machines are produced." About the large farm-machine industries in Minneapolis, St. Louis, Kansas City and Davenport, the textbook says nothing. On p. 60 Muncie and Richmond are noted among the six "especially large centers of the flour-milling industry", and on p. 61 among the five "large centers of the canning industry," although they answer neither description.

The work contains a great deal of material about business conditions, but almost no characterization of their changes during a protracted period, which is more important for a course in economic geography. For example, the author notes the reduction, for a number of post-war years, in the wheat and corn crops, but does not say that they now considerably exceed the pre-war harvests.

The regional part is even less successful than the general survey. The main defect of this section, aside from factual errors, is the improper method of describing the regions. Taking as a basis the correct division of the the United States into North, South and West, the author, in characterizing these large regions, does not note the characteristics of their basic parts, nor does he stress intra-regional differences.

The entire South is described as a single unit. Yet the economy of the northeastern margin of the South (Delaware, Maryland, West Virginia and northern Kentucky) is closer to the industrial Northeast than to the "deep South." Also very different from the "deep South" is the Southwestern Center with its large petrochemical and electrometallurgical industries. But the textbook does not discuss the distinctive aspects of the Southwestern Center and the other regions of the South.

In describing the North, the author confines himself to a discussion of "the most important industrial regions" (agriculture is discussed separately), but the fundamental differences between the main parts of the North are disregarded. Not even the characterization of "the most important industrial regions" reflects the actual state of affairs. For example, in eastern New England only the development of the textile, leather, footwear and garment industries are noted As a result, the impression is created that eastern New England is a region of exclusively light industry. In fact, an electrical and radio industry, instrument manufacture, aircraft engine manufacture and other branches of precision machine construction have been developing there for many years; a chemical industry has also long existed in this region. The percentage breakdown of industry in large cities is also inaccurately shown. On Page 93 we read that Boston, largest industrial center of eastern New England, has a well developed leather, footwear, textile, sewing and printing industry; machine building is represented only by the production of equipment for light industry, some manufactures for the defense industry, and shipbuilding. Yet ,present-day Boston is above all a center of precision machine construction. In 1947, machine construction, the metal-fabricating industry and the chemical industry(the Boston industrial area is in second place as a United States rubber producer) accounted for about one-half of all workers engaged in the city's manufacturing industry, and the largest number of workers were employed in the electro-chemical industry.

The physical geography of the United States is usually well covered in the works of Soviet geographers and in the translated literature. Hence, it was natural to expect that the physical part of the book under review should also be written fairly well.

However, the chapter on "Natural Conditions" cannot be regarded as successful. On Page 13 we read: "East of the Rockies, in the whole central part of the United States, lie the so-called Central Plains, consisting of the of the Prairie Plateau in the west, the Great Plains in the east and the Mississippi Lowland in the southeast." But actually the Great Plains occupy the extreme west of the Central Plains and in some works of Soviet geographers they figure under the name of Prairie Plateau (4). A few lines above the author notes that the altitudes of the "Coastal Rockies" do not exceed 2,000 meters, although in reality many summits rise considerably higher. On the same Page 13 the inconvenience of communications across the Appalachians is explained by saying that "the foothills of the Appalachians, the Piedmont, drop steeply to the east toward the Atlantic Coastal Lowlands." However, the Piedmont bench can act as an obstacle only to navigation, since its relative altitude does not exceed a few dozen meters, and at places it is even less evident. The real barrier to communications across the Appalachians is the edge of the Appalachian Plateau, the so-called Allegheny Mountains, which the author does not mention. On the same page it is stated that "south of the Appalachians lies the Fore-Appalachian Plateau with large deposits of coal, oil and natural gas." This is untrue. In the first place, the above-named region belongs to the Appalachian system and is called the Appalachian Plateau, and, in the second place, it is not located to the south, but to the west of the folded zone of the system. Unfortunately, this page is no exception in the work under review.

This textbook does not give an objective representation of the United States. The American reality is given a one-sided treatment in B. N. Semevskiy's work. It insists upon showing the shady side alone. This is obvious from a comparison of the general characterization of the agriculture of the United States given in the work under review with the characterization given by the head of the Soviet agricultural delegation to the United States (5).

References

1. Bituminous Coal Trends, 1956, 41.
2. Academy of Sciences of the USSR, Institute of Integrated Transportation Problems. Transport. Moscow, 1956, p. 144.
3. In 1947, 67.7 per cent of the workers employed in the manufacturing industry and 83 per cent of those employed in machine building in the United States were concentrated in the eastern industrial half of the North.
4. The name "Prairie Plateau" does not occur in the American literature. On the Soviet college wall map of the United States and on the map inserted in the Great Soviet Encyclopedia (in the article on the United States), this plateau is correctly named the "Great Plains."
5. V. Matskevich, Chto my videli v SShA i Kanade (What we saw in the United States and Canada), Gos. izd.polit.lit, Moscow, 1956.

A Letter to the Editor by B. N. Semevskiy

(From Izvestiya Vsesoyuznogo geograficheskogo obshchestva, 1958, No.6, Page 571).

Izvestiya VGO, 1958, No. 3, published a review by A. K. Arskiy of the text of my lectures on "The United States of America; a short economic-geographic survey," regarding which I would like to make some remarks.

1. The text was that of my 1954 lectures in the Geography Faculty of the Leningrad Teachers College named for A. I. Gertsen. The text was published in an edition of 600 copies for the use of students of the faculty. The last corrections were made in 1955. A glance at the imprint shows that the text was released for printing on April 21, 1956.

Ignoring these dates, the reviewer accuses me of employing obsolete data. For example, he declares that the author "says nothing about the post-war plants at Paducah, in the Portsmouth area, and on the Savannah River" (p. 294). Both of these atomic plants were built in 1956. Unfortunately, I do not possess the gift of clairvoyance to foresee what would be built in the United States after the text of the lectures was released for the press.

2. The reviewer declares: "The book was written mainly from materials taken from old textbooks (which ones ? Thus far we have not yet had any college textbook on the economic geography of foreign countries -- B.S.), reference works and translations, as well as from newspapers and journals" (p. 294).

Most of the numerical data in the text of the lectures (not "the book") was taken from the U. N. Monthly Bull. of Statistics, 1955, and the Stat. Yearbook, 1954. Incidentally, in the footnote on p. 52 there is a direct reference to the first of these sources.

In view of the fact that the publication is a text of lectures, not a scientific article, much less a monographic study, I give almost no references to sources, but anyone familiar with the literature on the United States can easily determine that I was unable to draw many of the cited data in 1954-55 from any except foreign publications. By the way, I see nothing wrong with using mainly Soviet sources for lectures.

3. The following judgment of the reviewer provokes astonishment. "The textbook (first "book", then "textbook", why not right away "monograph" for the text of lectures having the subtitle "short survey" --B.S.) does not give an objective representation of the United States. The American reality is given a one-sided treatment in B. N. Semevskiy's work. It insists upon showing the shady side alone" (p. 296).

I think that the reviewer represents the American reality in a rosy light. What "sunny sides" in the economy of the United States (or even more broadly, "in the American reality") should I have touched upon in the reviewer's opinion ?

About the great achievements of science and culture in the United States I speak (p. 36) to the extent that is appropriate in lectures on economic geography; I note the high level of economic development (pp. 37, 43-4, and elsewhere) and I point out the considerable advantages of the United States over Britain (pp. 50-51), the achievements in the growing of corn and the high yields obtained from that crop (p. 67), and so forth.

4. I acknowledge, of course, that the text of my lectures has certain defects, but I assume that every author has the right to demand that a reviewer take into account the time of publication of his work.

SOME IMPRESSIONS FROM A VISIT TO THE UNITED STATES

By B. N. Semevskiy

(From Izvestiya Vsesoyuznogo Geograficheskogo Obshchestva, 1959,
Issue 2, Pages 149 - 152).

(Introductory note from Editor, Soviet Geography. The following article is presented for two reasons: (1) It is the first recent account by a professional Soviet geographer who has visited the United States. (2) It typifies the kind of impressions obtained on a casual and rather superficial visit to a strange country. Readers will note a considerable number of factual errors, particularly in names and figures. For example, the membership of the American Geographical Society was about 3,400 and that of the National Geographic Society more than 2 million at the time of Semevskiy's visit. The president of the National Geographic Society is Melville Bell Grosvenor. (Newman Bumstead is assistant chief cartographer.)

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In September and October, 1958, the writer had the opportunity to visit the United States as a member of a tourist group of fourteen persons. Our trip through the country included stopovers at New York, Washington, Chicago, Buffalo and Niagara Falls. We traveled by plane from Moscow to Paris, by train to LeHavre and by the ocean liner Flandre to New York. The return trip, which took 19 1/2 hours, including six hours of stopovers in Paris and Prague, was on an Air France plane from New York to Prague and on a TU-104 from Prague to Moscow.

Of the higher educational institutions of the United States we had an opportunity to acquaint ourselves in some detail only with Columbia University, which has 24,000 students (including about 1,000 Negroes) and a teaching staff of 3,500 persons. The university, one of the oldest in North America, was founded in 1753, twenty-three years before the Declaration of Independence. Like most better universities in the United States, this is a private educational institution, and its activity is directed by a board of trustees, consisting of financiers, who contribute to the University's financial support. The high tuition limits the possibilities of entrance into the university by persons with lower incomes.

Only about ten per cent of the students receive scholarships; the financial situation is not taken into consideration in granting scholarships; only "ability" counts. The amount of the scholarship grant is considerably lower than the total tuition.

The university is made up of fifteen colleges and faculties, including the School of Tropical Medicine in Puerto Rico. The university organizes numerous expeditions, one of which is now in the area of the North Pole.

There is a Department of Geography, headed by Prof. William Hance. (Actually John E. Orchard is department head -- Editor, Soviet Geography). This department provides geography courses in the different schools. The following courses are given in the School of Business: economic geography (Prof. Hance and Mr. Shaffer), economic geography of the United States (Mr. Hennessy), economic geography of Latin America (Mr. Lloyd-Jones), economic geography of Asia (Mr. Stock), economic geography of Africa; economic geography of Europe (the last two courses are not being given in the current semester).

Courses are also given in other faculties. Students who have chosen geography as their main subject (the choice of subject is optional) are also given the following courses: introduction to physical geography (Messrs. Butler and Bentley), physical geography - principles of cartography, geomorphology, meteorology, climatology and soil science (Prof. Strahler), general climatology (Mr. Thor), general meteorology (Mr. Rommer), conservation of natural resources (Prof. Zobler), African problems and opportunities (Prof. Hance), regional economy of Latin America (Prof. Otte), regional economy of Europe (not given in the current semester). (This listing appears to have been taken from the Columbia College and General Studies catalogues and does not include the graduate courses in geography-Editor, Soviet Geography).

Professor Hance conducts a special seminar on geography, in which students do written work, reports and individual assignments on problems of economic geography.

In the Faculty of Philosophy there is a special Russian section, principally for language and literature. A special Russian Institute offers courses in "The Structure of the Soviet Economy," "Political Institutions of the Soviet Union" (actually, the government structure of the USSR and the social structure), "The History of Russia before 1914," "The Russian Revolution and the New Regime". We had no opportunity to acquaint ourselves with the character and trend of these courses.

The United States has three voluntary geographic organizations, whose activities extend over the whole country. (1) The Association of American Geographers, uniting specialists in the field of geography. Its president is Professor Chauncy Harris. Members of the Association are elected from among persons who have gained distinction in geography. Its printed organ is The Professional Geographer. (2) The American Geographical Society in New York, numbering about 600 members, both specialists and amateurs. The society may be joined by anyone who desires. Its president is Professor Charles Hitchcock. Its printed organs are The Geographical Review and Focus (each issue of the latter is devoted to a single country or problem). (3) The National Geographic Society in Washington, a touristic rather than a scientific geographic organization. Anyone who desires is accepted (upon payment of dues). The membership is about 6,000. Its president is Professor Bumstead. Its printed organ is the popular illustrated National Geographic Magazine.

During the journey through the United States there was an opportunity to observe some phenomena of interest to the geographer.

In New York, land prices are very high (in the center of the city, one square meter costs as much as $40,000). All the more strange to observe, virtually within the city limits (though administratively in the state of New Jersey), the extensive swampy valley of the Hackensack River overgrown with reeds and sedge and entirely unused economically. Its reclamation would probably make it possible to supply vegetables, if not to the whole city, at least to a considerable part of it. However, the demand for vegetables in New York is fully satisfied through outside supplies, and it is impossible to compete with the existing vegetable monopoly under present conditions. Draining of the valley even for housing construction is considered "unprofitable." As a result, vast expanses of utter wilderness can be observed three to four km. from the center of the city.

In the Piedmont, in the valleys of the Delaware and Potomac Rivers, there are many forest. All this is secondary growth represented by young, low-quality oak and shrubs. Along the rivers are found woods of the floodplain type. Judging by the external appearance, these forests can have no economic significance, except as windbreaks and parkland.

Somewhat more inspiring in appearance are the Appalachian forests, with a predominance of oak and chestnut, but their value in forestry is not great.

The predominantly rural landscape along the Erie Canal was unexpected. I had expected to see a solid line of industrial cities, but there were not many of them. As one travels parallel to the Erie Canal, the main landscape is formed by small groves of beech, yellow birch, maple and elm. Contrary to the notions that are widespread in the literature, I saw almost no coniferous species in the Appalachians.

The Pittsburgh area presented a very interesting view. The Monongahela and Allegheny Rivers join here to form the Ohio River. On the approaches to Pittsburgh from the southeast, torrential mountain streams have carried down masses of detritus and exposed the bedrock of the Carboniferous system. As a result, the coal is almost on the surface. This area has no large steel industry, only many miners' villages and coal mines. Just before Pittsburgh the high left valley bluff of the Monongahela River exposes classic outcrops of the Pennsylvanian system (corresponding to the Middle and Upper Carboniferous).

The Appalachians crowd the city of Pittsburgh and its industry on to a small plateau lying 130 to 140 m. above the level of the Ohio and up against the bank of the river. One gets the impression that, if the pavements of Pittsburgh were removed, coal could be mined in the center of the city. It seems as if the city stands directly on coal.

The railroad is laid along the river. It runs along the terrace of the right bank, and the high valley bluff sometimes causes it to hug the water's edge. On the right bank there are few industrial enterprises (there is no room for them!), but they are diversified: an oil refinery, machine-building plants, railroad shops, and so forth. The left bank, on the other hand, is a solid line of steel plants. But we did not see the sea of fire-belching giants we had expected. Open smelting is done to a very slight extent. The large number of high-voltage electric power lines indicate the amount of electric smelting. The Appalachians, covered with forest, extend down to this line of plants and sometimes narrow it to a few dozen meters. The industrial plants have been distributed areally not only in accordance with the coal deposits and cheap waterways, but also the relief, which limits areas of industrial construction.

The kindness of Professor Chauncy D. Harris afforded me an opportunity to see the most interesting parts of Chicago. The business center of the city, the Loop, is surrounded by a loop of the elevated railway, which passes over the heads of the pedestrians.

South of Chicago, in the Lake Calumet area, there has been much new construction in recent years, almost exclusively of heavy industry. This area has become the biggest steel producer in the country; the city of Gary has merged with it (although Gary is administratively in another state, Indiana, whereas Chicago is in Illinois). In 1957, 26 million tons of steel were smelted here. The largest steel plant in the United States (with a capacity of 8 million tons of steel a year) is located in Baltimore; the next two largest are in Gary (7 1/2 million tons) and in Chicago 6 1/2 million tons).

North of the Loop, on the shore of Lake Michigan, is the old meat-packing area. Now only the offices of the meat-packing companies are left, while the meat-packing plants have been moved to the western outskirts toward the railroads and highways by which the livestock is brought in.

The United States meat industry is shifting westward. Such cities as Omaha and Kansas City have overtaken Chicago in the slaughtering of cattle and the production of beef, but in the production of pork Chicago continues to remain the largest center in the country.

In the past, ethnic groups lived in separated areas in Chicago, but during recent years there has been a mixing of the different nationalities, particularly in the outskirts in the new development areas which consist chiefly of small one-story, one-family homes.

Skyscrapers are typical only in the center of Chicago. New York has become the city of skyscrapers. Philadelphia (third in population in the country) has only twelve skyscrapers; the number is no greater in Buffalo, and a city such as Trenton has only one skyscraper. Washington has none. Most typical of those states through which we traveled (New York, New Jersey, Pennsylvania, Delaware, Maryland, Virginia (probably West Virginia -- Editor, Soviet Geography) Indiana, Illinois, Ohio) are cities with two and three-story buildings, and one-story homes on the outskirts. Rural populated centers of the village or hamlet type are completely absent; the town or the individual farm are the main types of settlement.

The Niagara Falls produce a great impression. At present two Canadian hydroelectric stations are operating on the hydro-resources of the Niagara River; one with a capacity of 1.5 million kw., the other, 600,000 kw. Fifty per cent of the electric power produced by them is sold in the United States (for the needs of the power grid of the state of New York). There are several small electric power stations belonging to individual industrial plants. The Niagara Power Project with a planned capacity of 2 million kw., is now being built with United States Federal funds on the United States bank. According to the plan, a canal above the falls will divert water from the Niagara in the nighttime into a reservoir, so that there will be no falls at night. According to calculations, the amount of water collected during the night will be sufficient for 24-hour operation of the station, and by day the falls will be restored so as not to reduce the influx of tourists to Niagara Falls, a city one half of which is on United States territory (New York State), the other in Canada (Province of Ontario).

The building of the hydroelectric station is encountering opposition from the Edison Company, which controls electric power in New York State. One of the directors of the company told us that they would try by every means to bring about the transfer of the Niagara Power Project to them, or at any rate to gain control over it. The Edison Company owns nine thermal electric power stations, with a total capacity of 4.8 million kw. Three more electric stations are being built (in the New York residential area of Queens, 45 miles above New York on the Hudson River and on an island at the entrance to New York Harbor), which, according to plans, are to increase the capacity of the company's electric stations by one million kw. by 1961. An atomic electric station with a planned capacity of 250,000 kw. is also being erected.

The company supplies steam (for heating buildings) and gas to New York. Formerly gas was produced in Queens, but now the system has been converted entirely to natural gas, piped in from the south.

The monopoly position of the company in the field of electric power, gas and steam enables it to maintain high prices. The reason why it is endeavoring to subordinate Federal hydroelectric construction to itself is quite understandable.

Fifteen or twenty years ago New York was still a city of three and four-story houses without elevators. Skyscrapers were characteristic only of the southern part of Manhattan (where the financial and commercial center of the city is located) and of the area south of Central Park. Since then, there has been a great deal of construction of skyscrapers, which now make up the skyline of all New York proper, situated on Manhattan Island.

The construction of skyscrapers is explained chiefly by the high prices for land and hence by the endeavor of landlords to extend their properties upward, not sideward. Quite sturdy low buildings, in no need of major or even medium repairs, are being ruthlessly torn down and skyscrapers are being erected in their place. The principal construction (especially in the center of the city) is done by private companies. Characteristic of the construction in the last few years is use of aluminum frames and of glass of a greenish tint.

Higher rents are charged for office space than for apartments. The reason is that the amount of apartment rent from individual tenants is limited by law (although it is very high and usually constitutes as much as one-fourth of a worker's salary). There are no limitations on rent collected from business enterprises. Hence, landlords strive to rent space for offices, not apartments. This is one of the reasons for the current shifts in the micro-geography of the city: in the center, living quarters are gradually being replaced by office quarters, and population is expanding through a growth of the suburbs.

To a limited extent, municipal construction is being done in some parts of the city (financed by taxation and, in part, by charity) near the East River in eastern Manhattan (Borough Drive) and in the north, near the Harlem River, in the Negro quarter of that name (Housing Project). These multi-story brick buildings have no outside finish at all (not even plaster).

Because of racial discrimination in the South, there is a large Negro influx into New York. Negroes now number about 800,000 in the city, which also includes 650,000 Puerto Ricans. Among them are many unemployed.

Race segregation is clearly felt in New York: about three-fourths of the Negro population lives, as before, in Harlem. On such fashionable streets as Madison Avenue, Park Avenue and Fifth Avenue there is not a single apartment rented by Negroes.

Of the numerous museums in New York, the Museum of Natural History, which is geographic in character, produces the greatest impression upon the geographer. It contains a large number of panoramic displays, in which various natural zones are represented in a technically skillful manner. The exhibits are so arranged that it is perhaps more accurate to speak of a display of various animals in their typical "environment" (natural surroundings) rather than natural zones. One sees the animals, as it were, in the natural conditions of their habitat.

I should like to note that we were received hospitably not only by the few geographers with whom we had an opportunity to meet (Prof. Chauncy D. Harris, Prof. Carleton P. Barnes and others), but also by other Americans. They expressed great interest in our country and in establishing mutual understanding and collaboration between the Soviet and American peoples.

* * *

ATLAS MIRA (Atlas of the World). Military-Topographic Administration of the General Staff. Published by the Military Publishing House of the Ministry of Defense of the USSR. Moscow, 1958. ("Library of the Officer of the Soviet Army and Navy"). 268 pp. of maps and 188 pp. of text. Price: 30 rubles.
Reviewed by Ye. Ye. Shvede.

(From Izvestiya Vsesoyuznogo Geograficheskogo Obshchestva, 1959. No. 1, Pages 97 - 98).

Alongside the great so-called desk atlases of the world, fine examples of which are the Atlas Mira (Atlas of the World) of 1954 and the Bol'shoy Sovetskiy Atlas Mira (Great Soviet Atlas of the World), the small reference atlases must also be recognized as having great significance. Such small atlases include the new Atlas Mira published for the special "Library of the Officer."

The Atlas consists of two parts: maps and statistical reference data. The maps are grouped by sections.

The introductory section includes various reference maps: a comparison of aerial photos of a locality (vertical photos on various scales, oblique photo, photo map) with a topographic map of the same locality; locality types (photos) and a comparison of them with the corresponding topographic maps; a graph of the sunrise and sunset times; time zone maps; samples of topographic maps, samples of special-purpose maps; a sample of a marine chart. It is to be regretted that the marine charts are represented by a sample that is not typical of modern achievements in this field.

The first section, "Maps of the world, continents, parts of continents and oceans," contains 63 maps and opens with world maps (physical, climatic, political, maritime communications, airlines). Then follow maps of the continents and their parts. For each continent and its parts there are a physical map, mineral deposits, power and fuel resources, a political map, industry, population density and main transportation lines ; the same section contains maps of the principal straits and canals, grouped under the corresponding continents, as well as maps of the oceans. The scales of the continent maps range from 1:25,000,000 (for Europe) to 1:50,000,000; the maps of the parts of continents from 1:15,000,000 to 1:30,000,000, those of the oceans from 1:75,000,000 to 1:100,000,000.

The second section is entitled "Maps of the Union of Soviet Socialist Republics". It consists of 46 maps and 6 pages of text. General maps of the whole USSR (political, population density, physical, main transportation lines, industry and agriculture) are followed by maps of the Soviet Socialist Republics. For the RSFSR there are a general political-administrative map and maps of groups of oblasts. These are physical maps ranging from 1:500,000 to 1:750,000, with indication of the chief mineral deposits. For each republic there are text pages between the maps (size of the territory, population, economy, industry, agriculture, transportation, imports and exports). At the end of the section there are bathymetric maps of the Black and Caspian Seas at 1:7,500,000. The other Soviet seas are shown on various other physical maps. This circumstance is, of course, a defect in the Atlas because the latter maps are not bathymetric, and not even widely scattered depths are shown on all of them.

The third section is "Maps of Foreign Countries." It contains 79 maps and 24 pages of text. For each large country or group of smaller countries there is one physical map and one map of industry and agriculture. The text pages supply succinct data on territory and population, political parties, armed forces, industry (including military and atomic), agriculture, transportation, exports and imports; all these data relate to 1956.

The fourth section is "Capitals of countries and major cities of the world." The section consists of 38 pages, giving brief statistical data in addition to maps of capitals and other cities. The scales range from 1:250,000 to 1:500,000. They include many maps of ports, on which unfortunately very few depths are entered. (Of special interest to foreign geographers are maps of the capitals of the Soviet republics at 1:250,000 - Editor, Soviet Geography).

The fifth section is "Statistical reference data." Its 56 pages include 25 tables with information about the principal elements of the earth, parts of the world, the most important geographic features (oceans, seas, straits, ocean deeps, islands, rivers, lakes, canals, dams, bridges, etc.), areas and population of all countries of the world, population of the largest cities and other tables that supplement the atlas with varied information on physical, political and economic geography.

The atlas contains a useful table on "Oceans and most important seas," which includes the following information: areas, depth (average and maximum), salinity, average height of tides, water temperature at the surface and brief characteristics (currents, maximum height of tide, ice, storm period, typhoons, dangerous reefs, shallows).

Of great practical significance is the table on the "Yearly production of the principal commodities in selected countries," giving information both about the total volume of production and the per capita production for 1955 and 1956.

The atlas ends with a complete "Index of geographic names," containing over 27,000 names. The index is printed in clear type, facilitating its use. Appended to the atlas are a table of symbols (in addition to one placed in the introductory section), and a scale-measuring ruler for the approximate measurement of distances on the maps.

On the whole, the Atlas of the World is a great achievement of Soviet cartography and, in particular, of the Military-Topographic Administration of the General Staff. There has never been such a publication in the Russian language. Among the merits of the atlas are integration, a strictly observed structure based on the principle of proceeding from the general to the particular, application of generally equal-angle conical projections for most of the maps (use of other projections is indicated in each case on the maps), good cartographic format and clear type, and small size (octavo), so that the atlas is portable and easy for use under military conditions.

Among the defects of the atlas may be mentioned the relatively little attention paid to oceans and seas. It is stated in the "Introduction" that the Atlas is intended for officers of the Soviet Army and Navy, but the Atlantic and Pacific Oceans are presented on maps of very small scales. Of the Soviet seas, only the Black and Caspian are shown in satisfactory manner, while for the Baltic and Barents Seas the "Index of geographic names" recommends the use of the physical map of Europe at 1:25,000,000 on which it is almost impossible to make out the depths. For the Sea of Japan the "Index" refers merely to the map of the Pacific Ocean at 1:75,000,000.

In the next edition, which will doubtless soon be needed, this substantial defect must be taken into account. It would be desirable for the editorial office of the Morskoi atlas (Marine Atlas) to undertake the publication of a similar portable "Marine Atlas," in which the material of Volumes I and II of that fine publication would be presented in abridged form.

In spite of this defect, the Atlas of the World is worthy of the highest praise. Its principal aim has been attained: it gives its readers "systematized material on the military, political and physical geography of the countries of the world" and "can serve as a handy geographic reference work in the reading of political, periodical and military-historical literature" ("Introduction," p. V). The Atlas of the World can also be recommended to teachers of physical and economic geography as a reference work.

NEWS NOTES

By Theodore Shabad

Soviet Census of 1959. On February 4, 1960, the Soviet press published the second announcement of results of the census of January 15, 1959. (The first announcement, published in May, 1959, listed preliminary urban-rural totals of major civil divisions and all cities with a population of 50,000 or more). The second announcement gives the total resident population of the USSR as 208,826,650 as of January 15, 1959 (the official estimate as of the beginning of 1960 was 212,300,000), including 94,050,303 males and 114,776,347 females. The urban population is given as 99,977,695 (48 per cent of the total) and the rural population 108,848,955 (52 per cent).

The second census announcement consists of four parts: (1) educational level; (2) ethnic composition; (3) distribution by age groups and sex; (4) family status. Of greatest interest to geographers are the data on ethnic groups, the first to have been published in comparable detail since the 1926 census.

Ethnic groups of the USSR. The 1959 census identifies 108 ethnic groups by name and then lists "Others" totaling 17,000 persons.

1. Groups historically associated with European Russia (30):

Russians -- 114,588,000

Russian SFSR	97,845,000	Georgian SSR	438,000
Ukrainian SSR	7,400,000	Moldavian SSR	293,000
Kazakh SSR	4,014,000	Tadzhik SSR	263,000
Uzbek SSR	1,101,000	Turkmen SSR	263,000
Belorussian SSR	729,000	Estonian SSR	260,000
Kirghiz SSR	624,000	Lithuanian SSR	231,000
Latvian SSR	556,000	Armenian SSR	56,000
Azerbaydzhan SSR	515,000		

Ukrainians -- 36,981,000

Ukrainian SSR	31,852,000	Georgian SSR	52,000
Russian SFSR	3,377,000	Latvian SSR	29,000
Kazakh SSR	762,000	Tadzhik SSR	27,000
Moldavian SSR	421,000	Turkmen SSR	21,000
Belorussian SSR	150,000	Lithuanian SSR	18,000
Kirghiz SSR	137,000	Estonian SSR	16,000
Uzbek SSR	88,000		

Belorussians -- 7,829,000

Belorussian SSR	6,444,000	Latvian SSR	61,000
Russian SFSR	845,000	Lithuanian SSR	30,000
Ukrainian SSR	291,000	Estonian SSR	11,000
Kazakh SSR	108,000		

Tatars -- 4,969,000

Russian SFSR	4,077,000	Tadzhik SSR	57,000
Uzbek SSR	445,000	Kirghiz SSR	56,000
Kazakh SSR	192,000	Turkmen SSR	30,000

Lithuanians -- 2,326,000

Lithuanian SSR	2,151,000	Latvian SSR	32,000

Jews -- 2,268,000

Russian SFSR	875,000	Georgian SSR	52,000
Ukrainian SSR	840,000	Latvian SSR	37,000
Belorussian SSR	150,000	Lithuanian SSR	25,000
Moldavian SSR	95,000	Estonian SSR	5,000
Uzbek SSR	94,000		

Moldavians -- 2,214,000

Moldavian SSR	1,887,000	Russian SFSR	64,000
Ukrainian SSR	239,000		

Germans -- 1,619,000

Russian SFSR 820,000 (others mainly in Kazakh, Kirghiz, Tadzhik SSR's)

Chuvash -- 1,470,000 (1,436,000 in Russian SFSR)
Latvians -- 1,400,000 (1,298,000 in Latvian SSR)

Poles -- 1,380,000

Belorussian SSR	539,000	Russian SFSR	118,000
Ukrainian SSR	363,000	Latvian SSR	60,000
Lithuanian SSR	230,000	Kazakh SSR	53,000

Mordvians 1,285,000 (1,211,000 in Russian SFSR)
Bashkirs 983,000 (948,000 in Russian SFSR)
Estonians 969,000 (873,000 in Estonian SSR)
Udmurts 623,000 (613,000 in Russian SFSR)
Mari 504,000 (498,000) in Russian SFSR)
Komi and Komi-Permyak 431,000 (426,000 in Russian SFSR)

Bulgarians -- 324,000

Ukrainian SSR	219,000	Moldavian SSR	62,000

Greeks -- 310,000

Ukrainian SSR	104,000	Russian SFSR	47,000
Georgian SSR	73,000		

Karelians 167,000 (164,000 in Russian SFSR)
Hungarians 155,000 (149,000 in Ukrainian SSR)
Gypsies 132,000 (72,000 in Russian SFSR)
Gagauz 124,000 (96,000 in Moldavian SSR)
Rumanians 106,000 (101,000 in Ukrainian SSR)
Kalmyks 106,000 (101,000 in Russian S FSR)

Finns -- 93,000

Russian S FSR	72,000	Estonian SSR	17,000

Veps 16,000
Karaites 5,900
Saamy (Lapps) 1,800
Izhora 1,100

2. Groups historically associated with the Caucasus (27):

Azerbaydzhanis -- 2,929,000

Azerbaydzhan SSR	2,481,000	Armenian SSR	108,000
Georgian SSR	157,000	Russian SFSR	71,000

Armenians -- 2,787,000

Armenian SSR	1,552,000	Russian SFSR	256,000
Georgian SSR	443,000	Turkmen SSR	20,000
Azerbaydzhan SSR	442,000		

Georgians -- 2,650,000

Georgian SSR	2,558,000	Russian SFSR	58,000

Dagestan ethnic groups -- 945,000 (795,000 in Russian SFSR)
Avars 268,000
Lezghians 223,000 (98,000 in Azerbaydzhan SSR)
Darghins 158,000
Kumyks 135,000
Lak 64,000
Nogai 41,000
Tabasaran 35,000
Agul 8,000
Rutul 7,000
Tsakhur 6,000
Chechen 418,000 (no distribution data)

Ossetians -- 410,000

Russian SFSR	248,000	Georgian SSR	141,000

Kabardians 204,000 (201,000 in Russian SFSR)

Ingush 106,000 (no distribution data)
Karachai 81,000 (no distribution data)
Adyge 80,000 (79,000 in Russian SFSR)
Abkhaz 74,000 (71,000 in Georgian SSR)
Kurds 59,000
Armenian SSR 26,000 Georgian SSR 16,000
Balkars 42,000
Cherkess 30,000
Aissor 22,000
Abaza 20,000
Tats 11,000
Udins 3,700

3. Groups historically associated with Siberia and the Far East (27):

Koreans -- 314,000
Uzbek SSR 139,000
Russian SFSR 91,000 Kazakh SSR 74,000
Buryats 253,000 (252,000 in Russian SFSR)
Yakuts 236,000 (235,000 in Russian SFSR)
Tuvinians 100,000 (100,000 in Russian SFSR)
Khakass 57,000 (56,000 in Russian SFSR)
Altaians (Oirots) 45,000 (all in Russian SFSR)

Nentsy (Samoyeds) 25,000
Evenki (Tungus) 24,000
Khanty (Ostyaks) 19,000
Shors 15,000
Chukchi 12,000
Eveny (Lamuts) 9,000
Nanai (Golds) 8,000
Koryaks 6,300
Mansi (Voguls) 6,000
Selkups (Ostyak-Samoyeds) 4,000
Nivkhi (Gilyaks) 4,000
Ulchi 2,000
Udege (Ude) 1,400
Eskimos 1,100
Itelmen (Kamchadals) 1,100
Ket (Yenisey Ostyaks) 1,000
Orochi 800
Nganasan (Tavghi) 700
Tofalar 600
Yukaghir 400
Aleuts 400

4. Groups historically associated with Central Asia (8):

Uzbeks -- 6,004,000
Uzbek SSR 5,026,000 Kazakh SSR 137,000
Tadzhik SSR 454,000 TurkmenSSR 125,000
Kirghiz SSR 219,000
Kazakhs -- 3,581,000
Kazakh SSR 2,755,000 Turkmen SSR 70,000
Russian SFSR 383,000 Kirghiz SSR 20,000
Uzbek SSR 335,000 Tadzhik SSR 13,000

Tadzhiks -- 1,397,000
Tadzhik SSR 1,051,000 Kirghiz SSR 15,000
Uzbek SSR 312,000

Turkmen -- 1.004,000
    Turkmen SSR 924,000   Uzbek 57,000
Kirghiz -- 974,000
    Kirghiz SSR 837,000   Tadzhik SSR 26,000
    Uzbek SSR 92,000
Kara-Kalpaks 173,000 (168,000 in Uzbek SSR)
Uigurs-95,000
    Kazakh SSR 60,000   Kirghiz SSR 14,000
Dungans (Chinese Moslems) 21,000 (10,000 in Kazakh SSR)

5. Minor groups historically associated with foreign countries (16):

Turks - 35,000
Chinese - 26,000
Czechs - 25,000
Iranians - 21,000
Slovaks - 14,700
Arabs - 8,000
Beluchi - 7,800
Albanians - 5,000
Yugoslavs - 5,000
Spaniards - 2,400
Afghans - 1,900
Mongols - 1,800
Italians - 1,200
French - 1,000
Japanese - 1,000
Vietnamese - 800

Educational Status of Soviet Population in 1959. The total number of persons with completed higher education was 3,778,000, including 1,933,000 men and 1,845,000 women; 3,170,000 in urban areas and 608,000 in rural areas. The total number of persons with completed seven-year education was 54,930,000, including 25,712,000 men and 29,218,000 women; 34,458,000 in urban areas and 20,472,000 in rural areas. Regional variations in educational status are as follows (number of persons per 1,000 population):

	Completed higher education	Completed 7-year education
USSR as a whole	18	263
Russian SFSR	19	263
Ukrainian SSR	17	286
Belorussian SSR	12	225
Moldavian SSR	10	186
Estonian SSR	21	304
Latvian SSR	21	344
Lithuanian SSR	13	175
Armenian SSR	28	289
Azerbaydzhan SSR	21	261
Georgian SSR	38	315
Uzbek SSR	13	234
Kazakh SSR	12	239
Kirghiz SSR	13	227
Tadzhik SSR	10	214
Turkmen SSR	13	256

The 1959 census recorded literacy of all persons aged 9 to 49. A total of 1,929,000 persons, or 1.5 per cent of that age group, was reported illiterate, with a slightly higher literacy rate among men (99.3 per cent) than among women (97.8 per cent) and in urban areas (98.7 per cent) than in rural areas (98.2 per cent).

Age Distribution. The Soviet population in 1959 had relatively fewer children and more old people than in 1939. The percentage of children under 15 dropped from 37.7 in 1939 to 30.4 in 1959, while the percentage of persons aged 60 and more rose from 6.8 in 1939 to 9.4 in 1959.

The age distribution of males and females in 1959 follows(in thousands)

Age Group	Males	Females
0 to 9	23,608	22,755
10 to 19	16,066	15,742
20 to 24	10,056	10,287
25 to 29	8,917	9,273
30 to 34	8,611	10,388
35 to 39	4,528	7,062
40 to 44	3,998	6,410
45 to 49	4,706	7,558
50 to 54	4,010	6,437
55 to 59	2,906	5,793
60 to 69	4,099	7,637
70 and older	2,541	5,431
no age given	4	4

While the number of males and females is virtually balanced in the 0 to 31 age group, (an average of 501 males for 499 females), the disproportion is pronounced for age groups 32 and older (an average of 375 males for 625 females). The effect of war casualties is especially pronounced in the age group 40 and older, the greater part of which was of military-service age in World War II.

The crude birth rate in 1958 was 25.3 per 1000 population, the crude death rate 7.2 per 1000, infant mortality 40.6 per 1000 live births, and life expectancy 68 years.

Chinese Economic Statistics for 1959. A report on fulfillment of the Chinese economic plan of 1959 was made public in Peking on January 22, 1960. According to the report, the total value of output of industry and agriculture in 1959 was 241.3 billion yuan compared with 184.1 billion in 1958; the output of industry rose from 117 billion in 1958 to 163 billion in 1959, or by 39.3 per cent, while the output of agriculture rose from 67.1 billion in 1958 to 78.3 billion, or by 16.7 per cent.

Production figures for the principal commodities follow:

	1957	1958	1959
Steel (million metric tons)	5.35	8.0	13.35
(Of the 1959 total, 8.63 million tons were produced in large, modern plants and 4.72 million tons in small and medium-size plants. The total excludes steel produced by primitive, local methods.)			
Pig iron (million tons)	5.94	9.53	20.5
(Of the 1959 total, 9.45 million tons were produced in large, modern plants and 11.05 million tons in small and medium-size plants. The total excludes pig iron produced by primitive, local methods.			
Aluminum (thousand tons)	20	no data	70.4
Coal (million tons)	130	270	347.8
(Of the 1959 total, 130 million tons were produced in small mines under local jurisdiction.)			
Electric power (billion kilowatt-hours)	19.3	27.5	41.5
Crude oil (million tons)	1.46	2.26	3.7
Cement	6.9	9.3	12.27
Wood (million cubic meters	27.9	35	41.2
Chemical fertilizer (thousand tons)	798	811	1333
Metallurgical equipment (thousand tons)	8	no data	205
Power generators (thousand kilowatt)	164	800	2150
Machine tools (thousands)	28	50	70
Paper (million tons)	1.22	1.63	2.13
(Of the 1959 total, 1.7 million tons was machine-made and the rest handicraft.)			
Sugar (thousand tons)	864	900	1130
Salt (million tons)	8.3	10.4	11.04
Edible oil (thousand tons)	980	1100	1460
Cotton yarn (million bales)	4.65	6.1	8.25
Cotton cloth (billion meters)	5.05	5.7	7.5
Food crops (million tons)	185	250	270.05
Ginned cotton (million tons)	1.64	2.1	2.41
Soybeans (million tons)	10.0	10.4	11.5
Hogs (millions)	145.9	160	180
(The original hog figure for 1958 was 180 millions, and the original plan for 1959 was 280 millions. These figures were later revised.)			
Sheep (millions)			112.53
All large livestock (millions)	84	85	85.38
Cattle			65.43
Horses			7.6
Freight handled by all means of transport (million tons)		1320	2212
Railroad freight (million tons)		382	542

Tayshet Becomes Oblast City. The city of Tayshet (Irkutsk Oblast), which has been selected as the site for a Siberian iron and steel plant under the current seven-year plan, has been placed directly under the jurisdiction of the oblast. This is an indication that construction work is about to start.

Tayshet, which has a population of 32,000, is situated at the junction of the Trans-Siberian Railroad, the Lena Railroad, and the Eastern end of the South Siberian Railroad (under construction). The steel plant will use cokin coal from the Kuznetsk Basin and iron ore from Zheleznogorsk (Korshunikha) in the Ilim River area.

Kolomna Absorbs Shchurovo. The machine-building center of Kolomna (Moscow Oblast), situated at the confluence of the Oka and Moskva Rivers, has absorbed the cement-milling city of Shchurovo, on the south bank of the Oka River.

Molodechno Oblast abolished. Molodechno Oblast of the Belorussian SSR was abolished in January, 1960, and its rayons were annexed to the Vitebsk, Minsk and Grodno oblasts.

Zaterechnyy-Groznyy Oil Pipeline Opens. The new oil field of Zaterechnyy, discovered in 1956, has been linked by pipeline with the Groznyy refinery. Zaterechnyy is situated 110 miles north northwest of Groz and 50 miles east of Prikumsk, on the right bank of the Terek River.

New Siberian tin-mining center. A large tin-mining center is being developed on the Solnechnyy deposit, discovered in 1955. Solnechnyy is situated 35 miles west northwest of Komsomolsk in the Myaochan Mountains.

Krasnoyarsk Tire Plant Opens. The first automobile tires were produced in Krasnoyarsk in February, 1960. The tire plant, which is the easternmost in the Soviet Union, uses local synthetic rubber (obtained from ethyl alcohol produced by wood hydrolysis) and local tire cord (from synthetic fibers). The Krasnoyarsk tire plant has a capacity of 2 million tires a year.

Cheleken Oil Expansion. The Cheleken oilfield of the Turkmen SSR, on the Caspian Sea, is expanding production in offshore areas.

Kama-Vychegda Diversion. According to a recent Moscow radio broadcast, the State Planning Committee of the USSR has approved a scheme for diverting the water of the Vychegda River in northern European Russia to the Kama River, a tributary of the Volga. The scheme is one of the proposals designed to raise the flow of water to the Caspian Sea and halt the drop of the Caspian Sea level.

Natural Gas Reaches Yerevan. A natural gas pipeline from the Karadag field near Baku has reached Yerevan (Armenia). Natural gas will supply indu trial raw material and fuel for many of Yerevan's industries, including the synthetic rubber plant.

Second Tuymazy-Omsk Crude-Oil Pipeline Opens. The second crude-oil pipeline carrying petroleum from the Tuymazy field (around the city of Oktyabr'skiy in Bashkir ASSR) to the Omsk refinery has been completed.

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